



3 1761 11632540 8

3P01

UNIV. OF
TORONTO
LIBRARY

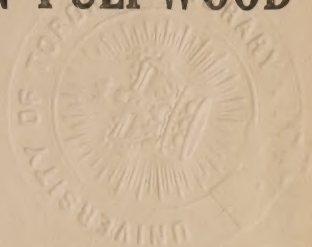
Gov. Doc.
Can.
Com.
p14-15 GEORGE V

Canada Pulpwood, Royal Commission on

(SESSIONAL PAPER No. 310)

(A. 1924)

REPORT OF THE ROYAL COMMISSION ON PULPWOOD CANADA



Chairman: JOSEPH PICARD

Deputy Chairman: WILLIAM A. ANSTIE

Commissioners:

JOSEPH G. SUTHERLAND, R. W. McLELLAN, A. B. KERR

Secretary: E. H. FINLAYSON, B.Sc.F.


Ottawa, July, 1924

PRINTED BY ORDER OF PARLIAMENT



226568
2.11.25

OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1924



Digitized by the Internet Archive
in 2023 with funding from
University of Toronto

<https://archive.org/details/31761116325408>

TABLE OF CONTENTS

	PAGE
Introduction.....	7
PART I—PULPWOOD RESOURCES IN CANADA	
Chapter I—Preliminary Remarks.....	9
Chapter II—Nova Scotia.....	14
Section 1—Total pulpwood resources.....	14
“ 2—Pulpwood controlled by Province.....	14
“ 3—Pulpwood partially controlled by Province.....	15
“ 4—Pulpwood privately owned.....	15
“ 5—Ownership of timber lands and pulpwood resources.....	16
“ 6—Provincial control of manufacture.....	16
“ 7—Consumption of timber.....	16
“ 8—Extent of pulp and saw-timber industries.....	20
“ 9—Trend of pulpwood business.....	22
“ 10—Summary of situation and duration of supplies.....	23
Chapter III—New Brunswick.....	28
Section 1—Total pulpwood resources.....	28
“ 2—Pulpwood controlled by Province.....	28
“ 3—Pulpwood partially controlled by Province.....	29
“ 4—Pulpwood privately owned.....	29
“ 5—Ownership of timber lands and pulpwood resources.....	29
“ 6—Provincial control of manufacture.....	30
“ 7—Consumption of timber.....	30
“ 8—Extent of pulp and saw-timber industries.....	33
“ 9—Trend of pulpwood business.....	35
“ 10—Summary of situation and duration of supplies.....	37
Chapter IV—Quebec.....	39
Section 1—Total pulpwood resources.....	39
“ 2—Pulpwood controlled by Province.....	40
“ 3—Pulpwood partially controlled by Province.....	40
“ 4—Pulpwood privately owned.....	41
“ 5—Ownership of timber lands and pulpwood resources.....	41
“ 6—Provincial control of manufacture.....	42
“ 7—Consumption of timber.....	42
“ 8—Extent of pulp and saw-timber industries.....	45
“ 9—Trend of pulpwood business.....	48
“ 10—Summary of situation and duration of supplies.....	49
Chapter V—Ontario.....	51
Section 1—Total pulpwood resources.....	51
“ 2—Pulpwood controlled by Province.....	51
“ 3—Pulpwood partially controlled by Province.....	52
“ 4—Pulpwood privately owned.....	52
“ 5—Provincial control of exports.....	53
“ 6—Consumption of timber.....	53
“ 7—Extent of pulp and saw-mill industries.....	58
“ 8—Trend of pulpwood business.....	61
“ 9—Summary of situation and duration of supplies.....	62
Chapter VI—Manitoba.....	63
Section 1—Total pulpwood resources.....	63
“ 2—Pulpwood controlled by Dominion.....	64
“ 3—Pulpwood partly controlled by Dominion.....	64
“ 4—Pulpwood privately owned.....	64
“ 5—Federal control of exports.....	65
“ 6—Consumption of timber.....	65
“ 7—Extent of lumber industry.....	66
“ 8—Trend of pulpwood business.....	66
“ 9—Summary of situation and duration of supplies.....	68

	PAGE
Chapter VII—Saskatchewan.....	68
Section 1—Total pulpwood resources.....	68
“ 2—Pulpwood controlled by Dominion.....	69
“ 3—Pulpwood partly controlled by Dominion.....	69
“ 4—Pulpwood privately owned.....	69
“ 5—Federal control of exports.....	70
“ 6—Consumption of timber.....	70
“ 7—Extent of lumber industry.....	71
“ 8—Trend of pulpwood business.....	72
“ 9—Summary of situation and duration of supplies.....	72
Chapter VIII—Alberta.....	73
Section 1—Total pulpwood resources.....	73
“ 2—Pulpwood controlled by Dominion.....	73
“ 3—Pulpwood partly controlled by Dominion.....	74
“ 4—Pulpwood privately owned.....	74
“ 5—Federal control of exports.....	74
“ 6—Consumption of timber.....	74
“ 7—Extent of lumber industry.....	75
“ 8—Trend of pulpwood business.....	76
“ 9—Summary of situation and duration of supplies.....	77
Chapter IX—British Columbia.....	78
Section 1—Total pulpwood resources.....	79
“ 2—Pulpwood controlled by Dominion and Province.....	80
“ 3—Pulpwood partly controlled by Dominion and Province.....	80
“ 4—Pulpwood privately owned.....	80
“ 5—Governmental control of exports.....	81
“ 6—Consumption of timber.....	82
“ 7—Extent of pulp and saw-mill industries.....	86
“ 8—Trend of pulpwood business in B.C.....	89
“ 9—Summary of situation and duration of supplies.....	90
Chapter X—Canada.....	91
Section 1—Distribution and ownership of pulpwood.....	92
“ 2—Requirements for manufacture in Canada.....	93
“ 3—Dominion consumption of pulpwood.....	94
“ 4—Exports of pulpwood.....	96
“ 5—Total consumption of main pulpwood species.....	102
“ 6—Extent of forest industry.....	103
(a) Pulp industry in Canada.....	105
(b) Lumber industry in Canada.....	107
(c) Other branches of forest industry.....	111
(d) General.....	112
“ 7—Summary of situation and duration of supplies.....	112
PART II—FUNDAMENTAL PRINCIPLES UNDERLYING A POLICY OF FOREST CONSERVATION FOR CANADA	
Chapter I—Preliminary Considerations.....	199
Chapter II—The Economic Use of Land.....	122
Chapter III—Land Classification.....	124
Chapter IV—The Dedication of Forest Lands.....	126
Chapter V—Forest Legislation.....	133
Chapter VI—The Forest Authority.....	139
Section 1—Nova Scotia.....	141
“ 2—New Brunswick.....	143
“ 3—Quebec.....	144
“ 4—Ontario.....	146
“ 5—British Columbia.....	147
“ 6—The Dominion.....	149
Chapter VII—Forest Surveys.....	154
Chapter VIII—Forest Protection.....	157
Protection from Insects and Fungi.....	157
Forest Fire Protection.....	160

	PAGE
Forest Fire Hazards	162
(a) Railways	164
(b) Campers, Hunters, Fishermen, etc.	164
(c) Settlement	165
(d) Settlers' and Logging Slash	165
(e) Miscellaneous Hazards	170
Organization for Fire Protection	170
Fire Prevention	171
Fire Detection	172
Fire Control	173
Fire Protective Organizations	175
(a) Nova Scotia	175
(b) New Brunswick	177
(c) Quebec	177
(d) Ontario	179
(e) British Columbia	180
(f) The Dominion	182
Chapter IX—Timber Administration	186
Agricultural Lands bearing Timber	187
Management of true Forest Lands	189
1. Regeneration	190
2. Intermediate Treatment	193
3. Utilization	193
(a) Reproduction of Desirable Species	194
(b) Protection	196
(c) Use of Forest Increment	201
(d) Forest Utilization at a Profit	201
Chapter X—Other Forestry Activities	202
1. Municipal Forests	202
2. Private Forests	203
3. Tree Planting	204
4. Silvicultural Research	206
5. Forest Products Research	206
Chapter XI—Some International Aspects of Forest Conservation and Some Comparisons ..	207
Chapter XII—Conclusions and Recommendations	211
Recommendations	213
1. Land Classification	214
2. Dedication of Forest Lands	214
3. Forest Legislation	214
4. Forest Authorities	215
5. Forest Protection	215
6. Forest Surveys and Inventories	216
7. Forest Management	216
8. Tree Planting and Woodlots	216
9. Silvicultural Research	217
10. Forest Expenditure	217
11. Forestry Conference	217
PART III—THE QUESTION OF PULPWOOD EXPORTS	
Preliminary Remarks	219
Section A—Individual or Organized Private Interests	220
1. Pulp and Paper Manufacturers	220
2. Private Individuals	224
3. Forestry Experts	225
4. Boards of Trade	226
5. Lumbermen	227
6. Farmers and Settlers	231
7. Timber-land Owners	235
8. Pulpwood Exporters	236
9. General	237

	PAGE
Section B—The National Interest.....	238
1. The Supplies.....	238
2. Use of Pulpwood Resources.....	239
3. Markets.....	240
4. The Issue.....	240
Conclusion.....	242

APPENDICES

Appendix 1.—Memorandum of the Canadian Pulp and Paper Association.....	243
“ 2.—Memorandum on Behalf of the Pulp and Paper Manufacturers of the United States.....	270
“ 3.—Memorandum of the Canadian Pulpwood Association	282

INTRODUCTION

Under the authority of Order in Council, dated August 14, 1923, P.C. 1576, the Commission was instructed to make an inquiry into the pulpwood situation in Canada. The terms of reference covering the commission were as follows:—

- “to inquire into and report on the forest resources of Canada, with particular regard to: —
- “(a) the extent in each Province of wood of various kinds available for the manufacture of pulp;
 - “(b) the quantity of wood so available on lands owned by Provincial Governments and subject, under Provincial laws and regulations, to restrictions requiring the partial or total manufacture of such wood in Canada;
 - “(c) the quantity of wood so available on lands owned by the Dominion Government and subject, under Federal laws and regulations, to restrictions requiring partial or total manufacture in Canada;
 - “(d) the quantity of such wood on other lands and the conditions under which such lands are held, whether by ownership or lease, whether by corporations or individuals, whether by citizens of Canada or citizens of other countries;
 - “(e) the quantity of pulpwood produced in each Province of Canada during the past ten years, showing the portion used in Canada and the portion exported;
 - “(f) the question of the prohibition or restriction of the export of pulpwood from Canada;
 - “(g) any other matter touching upon the production, manufacture or sale of pulpwood essential to comprehensive consideration of the next preceding section (f);
 - “(h) the making of recommendations that may be deemed expedient for the better conservation of the supply of pulpwood for present or future use.”

The inaugural meeting of the Commission was held in Ottawa on September 10, 1923, at the office of the Secretary of the Commission, E. H. Finlayson, Acting Director of Forestry. Organization meetings followed, during the course of which an analysis was made of the statistics and other information available, and machinery set in motion for the acquirement of further data. Plans were formulated for the taking of evidence in various parts of the Dominion. In deciding upon the itinerary of its tour, the Commission has striven to cover the situation adequately, compatible with reasonable expense. Representative points were selected in each province, meetings widely advertised, and every effort made to secure expression of all shades of public opinion upon the questions under enquiry. The Commission is under a debt of gratitude to the many public officials, and to the numerous persons in various walks of life, who voluntarily gave evidence of great value, and who in many cases went to considerable trouble in the compilation of special information. Special reference should be made to the works of the Bureau of Statistics; the figures published by this organization have been of inestimable value in compiling the report.

Throughout the enquiry, the Commission followed the practise of having witnesses appear voluntarily. That such procedure was justified is rather fully demonstrated by the great variety of persons who appeared before, or made representations to, the Commission.

In the province of Nova Scotia public hearings were held at Halifax, New Glasgow, North Sydney and Digby; in New Brunswick, at St. John, Fredericton, Newcastle, Bathurst, Campbellton and Edmundston; in the province of Quebec, at Montreal, Quebec City, Sherbrooke and Riviere du Loup, residents of this province also having the opportunity of appearing before the Commission at the Ottawa sessions. In Ontario, public hearings were held in Ottawa, Toronto, Port Arthur, Sault Ste. Marie, North Bay and Cochrane. It will therefore be perceived that, generally for eastern Canada, persons interested were given good opportunity to present their views without undue inconvenience.

In Western Canada, with the exception of British Columbia, the pulp and paper industry has not as yet been developed. In the Prairie Provinces, therefore, hearings were held only at Winnipeg, Prince Albert and Edmonton, at which points inquiry was made regarding the potential pulpwood resources of the respective provinces. In British Columbia, on the other hand, there has been very considerable development; consequently, hearings were held at Vancouver, Victoria, Prince Rupert, New Westminster, Kamloops, Revelstoke, Nelson and Cranbrook, thus meeting, so far as possible, the convenience of people in that province. A total of 382 witnesses appeared before the Commission at its public hearings. Although a great deal of the information received by the Commission was secured on these occasions, numerous representations in the form of petitions and correspondence were received from persons who were either unable to attend the hearings, or who, having done so, were desirous of submitting further statements. All of this evidence has been subjected to the most careful scrutiny and study, and the findings of the Commission are based upon all information received orally or by correspondence, publicly or privately.

Perusal of the terms of reference clearly indicates the scope of the enquiry. The Commission is required to determine upon the basis of the best available information, the amount and distribution of pulpwood supplies in Canada. Manifestly, the Commission could not undertake an actual survey of forest resources; rather, its duty has been to collect and correlate all the information which could be assembled in the course of public hearings and through consultation with those people who, officially or otherwise, have made it their business to secure reliable information of this character.

As influencing the extent of supplies, the Commission was required to investigate the status of pulpwood timber in various parts of Canada, with a view to determining the extent to which it is being used to supply Canadian industries, and the extent to which it is exported in an unmanufactured condition. Arising from the foregoing, the Commission is required to place before the Government the facts regarding proposals for the restriction of exports. Finally, the Commission is required to study the methods under which the timber is produced, managed, and used, with a view to the recommendation of measures which would more adequately ensure the maintenance of the forest resources in the state of continuous productivity.

There are, therefore, three distinct phases of the problem:—

- (A) The question of actual pulpwood supplies in various parts of the country, and the uses to which those supplies are put;
- (B) Questions of forest conservation, and recommendations in connection therewith;
- (C) The question of the prohibition or restriction of the export of pulpwood.

The general plan of the ensuing report is to deal separately with the three phases referred to above. Although it is aimed to follow, so far as possible, the sequence of the terms of reference, by reason of the varied classes of ownership and the divergence of forest authorities, it is necessary, in order to avoid frequent repetitions, to present the data in the manner which seems most appropriate.

PART I

PULPWOOD RESOURCES IN CANADA

CHAPTER I—PRELIMINARY REMARKS

In attempting an inventory of the pulpwood resources of Canada there are several factors affecting the situation which must be subjected to careful analysis before proceeding to statements of supplies available in Canada or in any individual province thereof. Following are some of the more important:—

(a) The very term "pulpwood" is under the present stage of development rather indefinite. The popular conception of a stick of pulpwood is a piece of wood four feet in length with a diameter of perhaps seven, eight, or nine inches. A stick of wood of this diameter being the ideal pulpwood bolt, the average person conceives a tract of trees of this size to be the ideal pulpwood forest. On the hypothesis, however, that the eight or nine inch *stick* is the ideal one, it must at once be conceded that the ideal pulpwood forest is one in which the *average* four foot stick is of that diameter. Obviously, this leads to the conclusion that the ideal *tree* for pulpwood purposes is eleven or even twelve inches in diameter; from that tree there are taken bolts all the way from three inches to eleven or twelve inches in diameter. Moreover, the fact that wood can be used to a three inch diameter does not indicate that an area containing trees of that small size can be operated with financial success. The average conception that the pulpwood forest is one of very small trees is therefore erroneous.

The foregoing remarks apply to eastern Canada. Such misconceptions have led to the belief that pulpwood may readily be distinguished from saw-timber on the basis of the size, when such is not the case; small saw-timber may also be used as pulpwood, and large pulpwood may also be used as saw-timber, to say nothing of similar overlapping which may occur between pulpwood and railway ties, fuelwood, fence posts and the like; all of which makes clear definition very difficult if not impossible. In fact, in British Columbia there is practically no distinction as to size. In that province pulpwood comes from spruce, hemlock and balsam logs exactly similar to those from which lumber is manufactured; indeed, to reduce the logs to such a size that they may be handled in the grinders or chippers of a pulp mill, they must first be sawn into blocks of convenient proportions.

With the foregoing explanation, it is manifest that much overlapping may occur, as between pulpwood and saw-timber, in a statement of resources for these products.

(b) Not only in size, but also in species, there is serious overlapping. Spruce, the most valuable tree for pulp manufacture, is also the mainstay of lumber production in Nova Scotia, New Brunswick, Quebec, Manitoba, Saskatchewan and Alberta. In the other provinces, also, large quantities of it are sawn into lumber. In lesser degree, the same may be said of balsam,—second to spruce in desirability for pulp manufacture, and to a limited extent sawn into lumber. Similarly, western hemlock of the Pacific Coast (a species very much superior to eastern hemlock, and in British Columbia just as important as spruce in pulp manufacture) is also used extensively for lumber. Eastern hemlock, on the other hand, largely used in lumber manufacture, is in Canada used only to a very limited extent in pulp manufacture, although much larger quantities are so used in the Lake States.

The jackpine of eastern Canada and the prairies and its kindred species in the Rockies and British Columbia, lodgepole pine, have not as yet been used very extensively in pulp manufacture. The jackpine, however, does enter appreciably into the consumption of many pulp mills in eastern Canada, and for kraft mills is an important species. It is rather generally conceded, also, that jackpine and lodgepole pine may before long be used to a very much greater extent, even in newsprint manufacture. As against present and potential use in pulp manufacture, these species are to a considerable extent used for lumber, and very extensively indeed for railway ties, fence posts and fuel.

Still further, poplar (aspen and cottonwood), of which only a couple of thousand cords is used in Canada for pulp, is in the United States used to the extent of between three hundred and four hundred thousand cords annually. It is true that its use is essentially confined to one method, the soda process; true also, that by reason of deficiencies in the qualities of its fibre, it can never be so satisfactory for pulp manufacture as species previously mentioned, yet, as a species, present in large amounts, it has decided potentialities, especially in view of diminution in supplies of the more valuable kinds. Poplar, also, is used in a limited way for saw-timber and for numerous other purposes.

There are still other species, referred to later, where this overlapping in uses may occur.

(c) Viewing the matter from another angle,—various species possessing the necessary physical properties of fibre in greater or lesser degree, but also used very extensively for saw-timber and other purposes, must in the final analysis be considered as potential pulpwood supplies. Douglas fir, so prolific on the Pacific coast, is now successfully used in the manufacture of kraft, and there is little doubt that in time processes will be devised whereby those properties, for which there are at present objections to its use in the mechanical or sulphite processes, may be removed. Similarly, although the difficulties to be overcome may appear far greater, there is hope at least that the birch, maple, and beech of eastern Canada—now in a large measure considered to be weed species—may economically be used for conversion into pulp products.

(d) There is also to be considered the question of region. At present there is not in Canada a single pulp mill between Fort Frances and the Pacific Coast. Are we, or are we not, then, to consider the Prairie Provinces as a region of potential pulpwood supplies? The fact that there is considerable probability of a mill being established in Manitoba, in the near future, indicates that the prairie provinces must be considered in this light. On the other hand, there are the Territories, Mackenzie River and Keewatin, the District of Patricia, and the Yukon. For a great many years at least they cannot be considered even as potential areas of pulpwood supplies.

(e) Again, there is the finer distinction of position or locality. Accessibility is a difficult thing to define, for, after all, it is relative. Some stands of timber which are under operation today were twenty-five years ago considered to be quite inaccessible. As new methods of logging are developed, and as the value of timber increases, due to depletion of stands at closer range, timber once considered inaccessible is brought to the market. Notwithstanding this indefiniteness of accessibility, there are areas of timber for which no future market can be foreseen.

(f) Finally, in considering the question of merchantability, we are again dealing with something which is relative. Unless we are to entirely neglect past experience, it is necessary to concede a value to some of the stands of timber now too remote for profitable operation, just as in more recent years we have learned to recognize potential value in a young stand of timber. Nevertheless, in a practical consideration of the supply problem, some line of distinction must be drawn between the merchantable and the unmerchantable, for undoubtedly

SESSIONAL PAPER No. 310

there are many thousands of miles of the forest area that bear a scrubby growth of timber too isolated to be of any local use, too small to be profitably operated even in the distant future, and too old and suppressed by conditions inimical to tree growth to permit of their development into anything better.

In outlining these governing factors, and in emphasizing the variation in importance which may be attributed to one or more of them, there is no desire to becloud the issue, nor is there any inclination to exaggerate the difficulties involved in approaching a statement of pulpwood resources. By way of analogy it may be stated that, whereas the geologist, as a result of many thousand precise measurements of "strikes" and "dips", may by purely mathematical calculation reach definite and well-understood estimates of coal resources (and, owing to obscurity of the coal, the estimates are seldom questioned) the individual or body that attempts an estimate of forest resources is confronted with a problem that entails many perplexing variables. Firstly, there is the growth or increment of timber due to biological processes; secondly, there are the many agents,—depletion by use, crudely measured as it is, and the wastage due to fires, insects, and fungus decay—which may reduce, offset, or even more than obliterate any increase in timber content due to growth. Such factors have very naturally engendered a feeling of caution, not only upon the part of scientific men engaged in forestry work, but in men engaged entirely in the practical business of forest utilization. It is nevertheless essential that consistent effort be made to itemize our resources as well as may be possible.

To this end, there is presented herewith, in Table No. 1, statistics showing the classification of land; the general character of the forest and status of ownership; the amounts of saw-timber now available; the quantities of pulpwood of the more important species, and the ownership and availability of such pulpwood. Figures covering all of these points are given for Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia. In Prince Edward Island the stand of timber is very small, merely serving the local demands, and it does not enter into the general problem. On the other hand, the Territories and the Yukon are eliminated from consideration, owing to their absolute inaccessibility, and to the great limitations in and inferiority of the timber growth. It is well to accentuate that the tables for saw-timber and pulpwood overlap; in other words, we have not in Canada the amount of saw-timber indicated plus the pulpwood shown; rather, the pulpwood figures include all of the saw-timber of the species mentioned.

In compiling the statement of pulpwood resources the Commission has had to depend to a large extent upon figures supplied by the federal and provincial services in charge of forest administration, and upon the information of persons having expert knowledge of the situation in various parts of the country. Great effort has been made to have the data presented herewith as truly representative of actual conditions as possible. For a considerable number of years, some of the forest services have engaged themselves in systematic investigation of forest resources, with a view to compiling a forest inventory, special surveys having been undertaken for this purpose. Although the results secured are admittedly estimates, they are nevertheless based on systematic and scientific enquiry, with a full knowledge of existing conditions. For this reason the results are much better than a guess,—which unfortunately has been the outstanding characteristic of many previous estimates; moreover, the figures may be taken as being the most reliable ones available, subject to correction though they may be as further data are acquired.

On these premises, and with Table No. 1 as a basis, we proceed to discussion of the pulpwood situation in various parts of the Dominion. In treating with conditions in the individual provinces, questions of conservation will not be dealt with in detail, as that subject will be considered more fully in Part II of

TABLE No. I.—FOREST AREAS AND PULPWOOD RESOURCES IN CANADA
(Not including Prince Edward Islands, The Yukon or the Northwest Territories)

Province	Total Area Sq. Miles	Water Area Sq. Miles	Net Land Area Sq. Miles	Agricultural Area Sq. Miles	Barren Land Sq. Miles	Forest Area Sq. miles		Total Forest Area
						Merchant- able and Accessible	Unmerchant- able and Inaccessible	
Nova Scotia.....	(1) 21,428	(2) 365	(3) 21,068	(4) 3,792	(5) 2,526	(6) 3,720	(7) 11,030	(8) 14,750
New Brunswick.....	27,985	74	27,911	4,671	1,764	18,000	3,476	21,476
Quebec.....	706,834	15,969	690,865	40,000	134,043	203,125	313,697	516,822
Ontario.....	407,262	41,382	365,880	60,000	65,880	75,000	165,000	240,000
Manitoba.....	251,832	22,500	229,332	57,332	34,400	27,600	110,000	137,600
Saskatchewan.....	251,700	14,200	237,500	113,000	74,724	25,000	24,776	49,776
Alberta.....	255,285	6,737	248,548	129,398	32,500	60,000	26,650	86,650
British Columbia.....	355,855	2,439	353,416	20,700	183,382	28,215	121,119	149,334
Totals.....	2,278,181	103,661	2,174,520	428,893	529,219	440,660	775,748	1,216,408

Province	Ownership of Forest Area Sq. Miles			Saw Timber Resources F.B.M.		Pulpwood Resources In Cords		
	Unalien- ated	Leased or Licensed	Privately Owned	Softwoods	Hardwoods	Spruce	Balsam	Hemlock
Nova Scotia.....	(9) 1,195	(10) 1,254	(11) 12,301	(12) 7,500,000,000	(13) 3,500,000,000	(14) 15,000,000	(15) 10,000,000	(16) 4,300,000
New Brunswick.....	1,680	9,121	10,675	9,073,710,000	8,634,000,000	24,114,000	8,806,000	3,270,000
Quebec.....	410,774	71,875	41,173	41,353,000,000	12,735,500,000	156,300,000	122,700,000	3,435,000
Ontario.....	183,428	48,600	7,972	15,112,000,000	7,735,000,000	114,870,000	12,630,000	4,140,000
Manitoba.....	127,021	2,095	8,484	2,335,000,000	105,000,000	22,000,000	1,150,000	Nil
Saskatchewan.....	43,335	1,175	5,266	3,950,000,000	4,000,000,000	30,850,000	1,600,000	Nil
Alberta.....	71,054	1,991	13,605	11,700,000,000	5,200,000,000	77,000,000	3,000,000	Nil
British Columbia.....	134,257	12,077	3,000	350,047,000,000	800,000,000	111,430,000	50,857,000	101,142,000
Totals.....	972,744	148,188	95,476	441,070,710,000	42,709,500,000	551,564,000	210,743,000	113,287,000

TABLE No. 1.—FOREST AREAS AND PULPWOOD RESOURCES IN CANADA—*Concluded*

Province	Pulpwood Resources In Cords					Status of Pulpwood Resources In Cords			
	Jackpine and Lodgepole	Poplar	Total Stand of Pulpwood	Available under present conditions	Total Stand Spruce, Bal- sam, Hemlock	Available Spruce, Bal- samt, Hemlock	Unalien- ated	Leased or Licensed	Privately Owned
Nova Scotia.....	(17) 100,000	(18) 500,000	(19) 29,900,000	(20) 20,400,000	(21) 29,300,000	(22) 20,000,000	(23) 322,000	(24) 3,946,000	(25) 25,632,000
New Brunswick	569,180	3,913,466	37,672,646	29,750,000	33,190,000	26,600,000	537,600	18,927,040	19,108,046
Quebec.....	17,775,000	44,940,000	345,180,000	160,000,000	282,435,000	131,000,000	146,920,000	178,000,000	20,220,000
Ontario.....	36,920,000	39,290,000	207,850,000	128,000,000	131,640,000	84,500,000	118,986,700	73,110,000	13,733,300
Manitoba.....	20,500,000	28,200,000	71,850,000	27,500,000	23,150,000	9,500,000	65,725,090	3,671,373	2,453,537
Saskatchewan.....	62,700,000	60,400,000	155,550,000	48,600,000	32,450,000	13,600,000	143,330,000	7,070,000	5,150,000
Alberta.....	85,000,000	110,000,000	275,000,000	81,000,000	80,000,000	26,000,000	261,347,000	7,277,000	6,376,000
British Columbia.....	28,572,000	3,057,000	295,058,000	135,000,000	263,429,000	125,000,000	126,500,000	149,029,000	19,529,000
Totals.....	252,136,180	290,300,466	1,418,030,646	630,250,000	875,594,000	436,200,000	863,668,390	442,103,373	112,231,883

EXPLANATORY NOTES

1. As indicated in the title of the Table, the figures do not include Prince Edward Island, the Yukon or the Northwest Territories, the timber supplies of which have practically no effect upon the present discussion.
2. In columns 12 to 18 inclusive, there is overlapping in timber quantities; i.e., the figures for saw-timber include all timber of saw-log size available under practices in effect in the various provinces; these larger sizes are also included in the cordage figures for pulpwood species. In computing saw-timber resources, there are instances where cruises are based upon different log-scales. In some cases, therefore, notably in Ontario, where the Doyle rule is used, the mill cut will over-run to a considerable extent figures shown in the table.
3. Poplar is included under the heading of pulpwood although the amount of this species manufactured into pulp in Canada is negligible. It is, however, used to a considerable extent in the United States.
4. Jackpine is used for pulp manufacture in Canada to a very limited extent only, but its use for this purpose will probably increase; it is therefore included.
5. Only in British Columbia is hemlock used to a material extent in pulp manufacture.
6. As explained in the text of the report, there are still other species which may in the future be used in pulp manufacture. At present, however, spruce and balsam supply over 93 per cent of pulpwood supplies; hemlock, jackpine and poplar together less than 7 per cent; and all other species only one-quarter of 1 per cent.
7. The figures in columns 19, 21, 23, 24 and 25 include all of the timber in the areas referred to, without regard to accessibility or merchantability. In columns 20 and 22 available supplies are shown. In the latter figures, most liberal application has been made of the terms "merchantable" and "accessible," all timber for which a market within many years can be foreseen has been included. In calculating supplies it is upon the latter figures that greater reliance must be placed.
8. Under "balsam," column 15 and elsewhere, is included the "white fir" of British Columbia.

the report. After dealing with the provinces, the general situation as regards pulpwood supplies in the Dominion, and the use of those supplies, will be described.

CHAPTER II.—NOVA SCOTIA

The most outstanding feature of the forestry situation in the province of Nova Scotia is that the great bulk of the forest area has been alienated in fee simple. Owing to its maritime position, the relative accessibility of all parts of the province, and the consequent availability of timber products for sea-borne traffic to foreign markets, the demand for timber cutting privileges was early in evidence. At the time of these early demands, the significance of the forest in successful permanent development of the state was not fully realized; nor had the principle that the state should retain reasonable control of forest areas been appreciated in any degree. Coincidental with the demand for timber, strong efforts were put forth to settle the province, and unfortunately, but scant consideration was given to the suitability for agricultural purposes of the land so settled upon. Consequently, long before there was any thought of conservation, the great bulk of the forest asset had passed from crown control.

SECTION 1.—TOTAL PULPWOOD RESOURCES

As indicated in Table I, the total forest area of Nova Scotia is 14,750 square miles—70 per cent of the land area. Of the latter a little better than one-quarter may be considered as merchantable and accessible. The total pulpwood stand, including spruce, balsam, hemlock, jackpine* and poplar, is estimated at 29,900,000 cords. Hemlock and jackpine may at once be eliminated, owing to the necessity for their use for other purposes—hemlock for lumber, and jackpine for railway ties and such purposes—and also on account of their limited distribution. This leaves a net stand of 25,500,000 cords of spruce, balsam and poplar, of which some 500,000 cords are of poplar. The proportion of poplar in the timber stand of the province is small; also, it has never been used to any extent in local pulp mills. During the past two or three years a limited amount, some 4,000 or 5,000 cords, has been exported to United States mills for use in the manufacture of book papers.

Confining discussion, therefore, to spruce and balsam we find a total stand of twenty-five million cords. Of this amount, not more than eighty per cent, at the very outside, may be considered as merchantable and accessible, or liable to become so in the future. Notwithstanding general accessibility of nearly every part of the province, by some method of transportation, there are considerable areas where timber growth is so sparse and stunted, that under conditions of natural regeneration the timber will probably never become merchantable for pulpwood or lumbering operations. We have, therefore, a net stand of approximately twenty million cords of spruce and balsam from which pulpwood supplies, and the lumber supplies of these particular species, must be drawn.

SECTION 2.—PULPWOOD ENTIRELY UNDER CONTROL OF THE PROVINCE

Timber lands in Nova Scotia have been alienated to such a great extent, in one form or another, that those areas to which the province retains full title are almost negligible, in so far as timber value is concerned. Only 1,195 square miles, or 8.1 per cent of the forest area, consisting largely of the riff-raff, but still having productive value if properly managed, remains in the Crown. There is estimated to be only 322,000 cords of the five species, widely scattered in

* Jackpine is also known locally as "princess" or "scrub" pine; and occasionally as cypress.

SESSIONAL PAPER No. 310

small blocks, and so far as present conditions are concerned, almost entirely unmerchantable. In determination of methods to be adopted in its disposal or use, however, the province has unquestioned and exclusive control.

SECTION 3—PULPWOOD UNDER REGULATIVE CONTROL OF THE PROVINCE

The total area of leased and licensed timber land is 1,254 square miles, 8.5 per cent of the forest area, estimated to contain a total pulpwood stand of 3,946,000 cords, largely balsam and spruce. The greater part of this area, approximately 814 square miles, and over 75 per cent of the timber, is included in one lease in Cape Breton Island, the balance comprising a large number of smaller areas leased to individuals and companies.

The terms of the lease in Cape Breton give the lessees entire control of operations, practically the only provincial control being a requirement for peeling or rossing of the wood in Canada. Without rejecting the terms of the lease, therefore, the province could not increase the degree of local manufacture required of the operators, nor in other directions control the methods of utilization. On the balance of leased lands, while the province retains the right to prescribe conditions of home manufacture, no actual control is exercised either in that direction, nor in regulation of the sizes cut. In fact, no inspection of operations is made at all, and the areas are to a greater extent treated as if they were private lands for the time being.

The practice of disposing of timber lands in fee simple at a stated price per acre continued until 1899, the object apparently having been to settle the country no matter whether farm or forest land was taken. In the latter year a lease system in connection with timber lands was introduced, and lessees secured tenure for a twenty year period (renewable for a further twenty years) at the fixed price of 40 cents per acre, this fee covering the entire period of the lease. In 1904 the Act was amended increasing the rate to 80 cents per acre, for which lessees were entitled to the privilege of cutting all timber to a diameter limit of ten inches. This practice continued until 1910 when, under consolidation of the Crown Lands Act, provision was made for the disposal of timber on a stumpage basis. The old provision for leasing, however, remained in the Act, and in actual practice it turned out that comparatively little timber was sold on the stumpage basis. The quantities of timber sold on the latter basis were so small, and the costs for scaling of cuts relatively so large, that the practice, being less productive of revenue than the other method, was discontinued. Even at the present time, in event of application for crown timber, it would be disposed of as a lease at so much per acre for the twenty year period. Some attempt is now made at appraisal, and higher prices charged than previously. By reason of complete absence of inspection, the provision as to the ten inch diameter limit is entirely inoperative. No attention is given to the question of manufacture, and except for limitations as to time, therefore, lessees enjoy practically the same privileges as private land owners.

SECTION 4—PULPWOOD ON PRIVATELY OWNED LANDS.

Of the total forest area, 14,750 square miles, an area of 12,301 square miles, or 83.4 per cent, has been alienated in fee simple. As a result, by far the greater part of the timber supply, a total of 25,632,000 cords or nearly 86 per cent of Nova Scotia's potential pulpwood stand, has passed completely out of control of the province. It is this situation which renders the more difficult and expensive the formulation and application of a rational forest policy in that province,—a step, however, which is none the less imperative.

SECTION 5—OWNERSHIP OF TIMBER LANDS AND PULPWOOD RESOURCES

An analysis of the status of ownership is of interest. No absolute figures are available, but, basing calculations upon the best information obtainable, it is possible to make some interesting and reasonably accurate deductions. Including the Cape Breton lease which, by virtue of the conditions previously described, is really beyond control of the province, a timber area of some 5,928 square miles is in the hands of some 329 holders or areas greater than 1,000 acres; there are some 1,056 owners of forest tracts between 200 and 1,000 acres in extent; and the balance of the privately owned forest is made up of parcels less than 200 acres in extent. For the latter two classes, namely, holdings of less than 1,000 acres, it has been impossible to segregate details; it may be concluded, however, that the greater part of such holdings is in the hands of local residents.

Of greater interest is a study of ownership of the larger holdings, for after all, the area of 5,928 square miles represents approximately 40 per cent of the provincial forest area, and over 48 per cent of the privately owned timber land; moreover, included in private lands of this category is the great bulk of the total 3,720 square miles of merchantable timber land of the province. Of the 5,928 square miles, approximately 17 per cent (1,018 square miles) is held by individuals, while the other 83 per cent (4,910 square miles) is held by companies and corporations. Viewing the matter from another angle, 4,221 square miles, or a little better than 71 per cent, is held by Canadian individuals, companies and corporations and 1,707 square miles (29 per cent) is under foreign control, essentially American. Of the 1,707 square miles under foreign control at least 1,331 square miles (78 per cent) is held by three American pulp companies that do not manufacture pulp within the province. In other words, approximately 9 per cent of the forest area of the province, and probably at least 14 or 15 per cent of the pulpwood resources, are in the hands of the three companies referred to. Including all foreign holdings, the great bulk of which are American, it may be deduced that somewhere from 17 to 20 per cent of Nova Scotia's pulpwood supplies are so held.

SECTION 6.—SUMMARY RE PROVINCIAL CONTROL OF MANUFACTURE

Lacking the right to impose manufacturing restrictions upon lands privately held, and having made commitments which restrict such action in the Cape Breton lease, it will be perceived that even in event of the province desiring to impose such manufacturing restrictions, the latter could only be applied to less than five per cent of the pulpwood stand in the province.

SECTION 7.—CONSUMPTION OF TIMBER IN NOVA SCOTIA

Although a discussion of saw-timber supplies and consumption—except insofar as they overlap or otherwise affect pulpwood supplies—is extraneous to the main object of this report, it is necessary that reference be made to this side of the question in order that the picture may be complete. Table I gives a total for the province of $7\frac{1}{2}$ billion board feet of softwood saw-timber, including, —in addition to the spruce, balsam, hemlock and jackpine, used to a greater or lesser extent for pulp—all of the white and red pine. In addition there is estimated to be a stand of $3\frac{1}{2}$ billion feet, board measure, of hardwoods. Confining

SESSIONAL PAPER No. 310

discussion, however, to the softwoods, the estimates for pulpwood species are as follows:—

Spruce..	3,750,000	M.B.F.
Balsam..	1,500,000	"
Hemlock..	1,650,000	"
Jackpine..	5,000	"
Total..	6,905,000	"

The balance of the $7\frac{1}{2}$ billion feet of saw material, viz., 595 million feet, consists essentially in white and red pine. On account of their increasing scarcity, and their high value for other purposes, white and red pine are necessarily eliminated from any consideration of pulpwood resources. The eastern hemlock, also, though in some regions used in pulp manufacture, is not extensively utilized for this purpose in Canada or the Atlantic States; in any case, the limited supply which remains in Nova Scotia is rather urgently required for saw-timber and such other purposes. As previously intimated, the limited amount of jackpine available is also required for other purposes.

This leaves the amount of $5\frac{1}{4}$ billion feet of spruce and balsam, of saw-timber quality, which converted to cubic measure represents $10\frac{1}{2}$ million cords. The latter amount, however, is included in the 20 million cords of available spruce and balsam pulpwood mentioned in section 1, and shown in Table I. It is now proposed to analyse consumption figures in order to see how the available supplies of these species may be expected to supply the requirements for both lumber and pulp manufacture. As a basis for study, four tables, II, IIa, IIb, and IIc, are presented herewith.

TABLE II.—LOCAL CONSUMPTION OF WOODS FOR PULP MANUFACTURE—
NOVA SCOTIA

Cords

Year	Spruce	Balsam fir	Hemlock	Poplar	Total
1913.	17,557	1,305	1,700		20,562
1914.	9,577	974	226		10,777
1915.	20,290	430			20,720
1916.	14,387	50			14,420
1917.	17,510	354	500	10	18,374
1918.	10,154	1,414		100	11,668
1919.	18,668	1,838	245		20,751
1920.	22,823	1,772			24,595
1921.	22,145	217			22,362
1922.	45,933	744		242	46,919
Total.	199,044	9,098	2,671	352	211,165

NOTE.—The table shows total consumption of wood in the Nova Scotia pulp mills. From this table, from Table IIb, and from the export statistics, Tables IIa and IIc are derived.

14-15 GEORGE V, A. 1924

TABLE IIa.—CONSUMPTION AND EXPORT OF PULPWOOD—NOVA SCOTIA—
SPRUCE AND BALSAM*Cords*

Year	Manufacture		Export	Total
	Spruce	Balsam	Spruce and Balsam	
1913.....	17,557	1,305	6,049	24,911
1914.....	9,577	974	1,557	12,108
1915.....	20,290	430	3,310	24,030
1916.....	14,387	50	3,735	18,172
1917.....	17,510	354	770	18,634
1918.....	10,154	1,414	.....	11,568
1919.....	18,668	1,838	15,712	36,218
1920.....	22,823	1,772	27,211	51,806
1921.....	22,145	217	29,800	52,162
1922.....	45,933	744	34,650	81,327
Total, 10 years.....	199,044	9,098	122,794	330,936

NOTE.—It is possible that the amount of spruce and balsam exported is in reality greater than indicated, as rail shipments are cleared at a New Brunswick port of exit, and are therefore reported in exports of the latter province.

TABLE IIb.—SPRUCE AND BALSAM MANUFACTURED INTO LUMBER—NOVA SCOTIA
M BOARD FEET

Year	Spruce	Balsam	Total
1913.....	156,311	5,251	161,562
1914.....	169,192	7,754	176,946
1915.....	184,922	7,091	192,013
1916.....	144,263	8,906	153,169
1917.....	142,695	4,664	147,359
1918.....	93,467	5,122	98,589
1919.....	146,941	7,509	154,450
1920.....	176,715	10,982	187,697
1921.....	73,805	4,838	78,643
1922.....	69,583	1,764	71,347
Total, 10 years.....	1,357,894	63,881	1,421,775

NOTE.—The table does not include the figures for total lumber production in Nova Scotia, but only for the species mentioned. The lumber cut of all species is shown in Table IIc.

The conversion into cords of timber used in lumber manufacture, as shown in Table IIb, and consolidation with figures for pulpwood consumption and export, as shown in Tables II and IIa, gives the total figures for spruce and balsam consumption in pulpwood and lumber. The only exception is a small amount of these species shipped by rail through New Brunswick for export to the United States. The amount handled in this manner will not appreciably affect the average figures arrived at in Table IIc.

SESSIONAL PAPER No. 310

TABLE IIc.—AMOUNT OF SPRUCE AND BALSAM CONSUMED IN MANUFACTURE OF LUMBER, PULP AND IN EXPORT—NOVA SCOTIA

Expressed in Cords - 500 B. ft. = 1 cord

Year	Spruce	Balsam	Exports, Spruce and Balsam	Total
1913.....	330,179	11,807	6,049	348,035
1914.....	347,961	16,482	1,557	366,000
1915.....	390,134	14,612	3,310	408,056
1916.....	302,913	17,862	3,735	324,510
1917.....	302,900	9,682	770	313,352
1918.....	197,088	11,658	.....	208,746
1919.....	312,550	16,856	15,712	345,118
1920.....	376,253	23,736	27,211	427,200
1921.....	169,755	9,893	29,800	209,448
1922.....	185,099	4,272	34,650	224,021
Total, 10 years.....	2,914,832	136,860	122,794	3,174,486
Average.....	291,483	13,686	12,279	317,448

Consideration of Table IIc reveals the fact that the average yearly cut of these two species for home manufacture of lumber and pulp, and for the export of pulpwood, was 317,448 cords. The only available figures for the amounts of timber used in some other directions, essential to the present discussion, are those of the decennial census. Figures covering 1920 indicate that in that year the farm woodlots of Nova Scotia supplied among others the following wood products:—

Fuelwood..	cords	568,966
Fence Posts..	pcs.	1,176,350
Rails..	"	1,176,016
Railway Ties..	"	95,252

Figures for individual species are not available, but it is quite certain that the great bulk of the fuel was hardwoods; still, a limited amount of softwoods is used. Probably the large part of the fence posts and rails are of species other than pulpwood, although spruce is used to a considerable extent for these purposes. As to railway ties, in the scarcity of jackpine it is quite probable that a considerable part of the total are of spruce. The railways also secure large quantities of ties from other sources. Considering all such uses, it is quite reasonable to assume that the spruce and balsam used for these purposes would increase the previous total average yearly consumption of spruce and balsam to some 340,000 cords. Finally, large amounts of both species are used in the coal mines of the province. The wood used in the latter industry in Nova Scotia is practically identical with that cut for pulpwood, both in species and sizes consumed, and from reports of mining industry it is quite certain that over 50,000 cords of spruce and balsam is consumed annually in coal mining operations. This brings the average annual grand total consumption of these two pulpwood species up to 400,000 cords per year.

So much for combined figures for the two species,—it will readily be perceived that, with the very limited amount of balsam used, (less than 5 per cent for lumber and pulp manufacture) the more serious situation exists in regard to spruce. With a total quantity of not more than 12 million cords of available spruce for all purposes, the average annual drain on supplies of that species has been not less than 330,000 cords.

14-15 GEORGE V, A. 1924

SECTION 8—THE EXTENT OF PULP AND SAWMILL INDUSTRIES

Table II*d* shows the wood consumed and the pulp manufactured at the various mills within the province.

TABLE II*d*

Year	Wood Consumption	Total Production
	Cords	Tons
1913.....	20,562	20,562
1914.....	10,777	10,777
1915.....	20,870	20,870
1916.....	14,437	14,437
1917.....	18,374	20,355
1918.....	11,668	10,017
1919.....	20,751	17,659
1920.....	24,595	23,384
1921.....	22,362	17,802
1922.....	46,919	37,562

Of the nine or ten pulp mills, only eight were active in 1921, and six in 1922. Statistics for the latter year give the province credit for a little less than 2 per cent of Canada's total production of pulp. Several years ago an attempt was made to introduce the manufacture of chemical pulp, but unfortunately the venture failed of success at that time, and so far no chemical fibre has been made. The production of the pulp mills is, therefore, still confined to groundwood; of the latter, Nova Scotia's production constitutes 3 per cent of the Canadian total for this class of pulp. No paper is manufactured in the province.

At the present time plans are under way for the construction of another pulp mill on the south coast, which will undoubtedly increase to a material extent the pulp production of the province. Latterly, also, hope has been revived that the chemical pulp mill already established, but hitherto a failure, may be brought into successful operation.

It is quite clear from the figures cited in Table II*d*, and from the foregoing remarks in that regard, that the pulp industry in this province has had an elementary and rather erratic development. By some this has been attributed very largely to the lack of sufficient water-powers. The Commission enquired into this side of the question, however, and although it is true that the province is by no means blessed with the abundant water-powers found elsewhere, there are, nevertheless, a considerable number of undeveloped sites which could be put to use if conditions in other respects warrant development for pulp manufacture. Rather than attribute lack of development of this industry to the lack of water-powers, we are inclined to the view that the underlying reason is the difficulty of securing, in sufficiently consolidated areas, adequate reserves of timber to justify the installation of large mills. Any person desirous of promoting the industry is, in the first place, confronted with the rather involved conditions of timber ownership. There are not still remaining in the Crown any considerable areas of pulpwood timber which would constitute satisfactory nuclei for pulpmill operations and there is, therefore, in considering a venture of this kind, the uncertainty as to whether promoters could acquire by purchase timberlands which would, on the basis of prices to be paid, justify the development.

These drawbacks notwithstanding,—favourably situated as it is from a shipping standpoint; in close proximity to foreign markets without the necessity of rail hauls; and with such a large percentage of potential forest land at its disposal,—the timberlands of the province are most assuredly capable of development to that position wherein they might support, in a stable manner, a pulp industry of more substantial proportions than that of the present time.

SESSIONAL PAPER No. 310

TABLE IIe.—NOVA SCOTIA LUMBER PRODUCTION, 1913 TO 1922 INCLUSIVE BY KINDS OF WOOD
QUANTITY CUT AND VALUE

Kind of Wood	1913		1914		1915		1916		1917	
	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value
Spruce.....	156,311	\$ 2,108,770	169,192	\$ 2,378,081	184,922	\$ 2,701,004	144,263	\$ 2,015,924	142,695	\$ 2,494,977
Hemlock.....	63,851	742,627	59,815	808,213	52,872	698,716	33,404	424,081	30,611	601,702
White Pine.....	28,918	478,540	17,265	277,657	25,591	539,012	16,354	254,260	12,467	273,593
Birch.....	13,095	171,317	16,600	233,775	16,436	225,705	11,703	156,249	6,303	144,562
Balsam Fir.....	5,251	59,165	7,754	95,407	7,091	87,583	8,906	116,143	4,664	84,048
Maple.....	2,946	37,404	2,957	37,169	4,102	55,784	1,934	25,215	567	16,334
Beech.....	1,770	23,643	2,908	34,945	1,570	24,669	1,428	19,166	12,958	258,726
Red Pine.....	1,657	24,490	1,207	18,084	1,101	17,039	1,578	23,857	1,878	33,329
Oak.....	614	18,938	474	13,303	356	10,425	211	5,750	185	7,100
Poplar (Aspen).....	95	1,038	53	647	90	1,193	561	7,574	20	358
Jack Pine.....	51	826	105	1,570	221	3,285	102	1,651	471	13,830
Cedar.....	50	600	444	5,335	2	60				
Ash.....	42	1,106	78	1,302	29	355	25	376	155	3,626
Poplar (Balsam).....	35	397	75	915	5	60	3	36		
Tamarack.....	26	273	13	168	70	1,029	129	1,690	1,221	23,336
Poplar (Cottonwood)...	10	130	38	555	3	36	116	2,312	100	2,000
Basswood.....			45	750	10	150			87	2,008
Elm.....			21	368	4	60	1	25	885	22,501
Butternut.....									1	15
Other Kinds.....									1,463	29,098
Custom Sawing.....									19,979	392,966
Poplar (All kinds).....										
Totals.....	274,722	3,669,264	279,044	3,908,244	294,475	4,366,165	220,718	3,054,309	236,710	4,404,109

Kind of Wood	1918		1919		1920		1921		1922	
	M. Ft. B.M.	Value	M. Ft. B.M.	Value	M. Ft. B.M.	Value	M. Ft. B.M.	Value	M. Ft. B.M.	Value
Spruce.....	93,467	\$ 2,163,495	146,941	\$ 4,058,326	176,715	\$ 6,167,144	73,805	\$ 1,971,833	69,583	\$ 1,745,922
Hemlock.....	25,528	589,954	28,414	853,249	44,261	1,455,461	20,418	453,929	20,447	469,543
White Pine.....	9,379	261,153	6,372	224,431	16,033	565,572	7,135	270,364	5,437	154,164
Birch.....	12,047	282,881	7,497	291,680	10,344	350,514	5,958	159,629	2,763	65,785
Balsam Fir.....	5,122	110,718	7,509	200,770	10,982	346,877	4,838	117,531	1,764	40,891
Maple.....	3,902	98,490	1,268	24,765	2,978	97,880	752	20,043	779	18,940
Beech.....	3,362	85,429	1,819	55,901	1,572	54,145	913	20,484	269	5,332
Red Pine.....	445	11,363	709	21,047	2,805	91,756	825	24,783	158	3,741
Oak.....	408	21,907	123	5,001	163	5,910	92	3,214	54	1,694
Poplar (Aspen).....	55	1,295	71	1,874						
Jack Pine.....	60	1,200	30	930	1,453	50,090	100	2,500	40	680
Cedar.....			70	1,400	1,601	51,035	242	6,956		
Ash.....	2	45	7	160	27	830	21	470	2	40
Poplar (Balsam).....	2,202	44,840	77	1,642						
Tamarack.....	26	515	1	40	2	60	26	640	1	15
Poplar (Cottonwood)...									35	685
Basswood.....	47	916			35	1,065			81	1,630
Elm.....	2	38	10	200			12	252		
Butternut.....										
Other Kinds.....	766	19,266			821	37,135	98	2,097	40	800
Custom Sawing.....	19,512	398,534	23,886	516,554						
Poplar (All kinds).....					354	10,460	11	270		
Totals.....	176,332	4,092,039	224,804	6,257,970	270,166	9,275,934	115,246	3,054,995	101,451	2,509,912

In Table IIe will be found complete figures for lumber production from all species. The peak production of the decade occurred in 1915, which year was preceded by two years of relatively high production. Serious falling off occurred in the following four years, and a rebound to figures comparable to those of earlier years occurred in 1920. The year 1921 shows a reduction of approximately 57 per cent from the previous year, and finally, 1922, the last for which figures are available, shows a still greater reduction,—the lowest cut in the decade.

—45101 150.09

In a province formerly containing stands of excellent merchantable saw-timber, there has during the past two or three generations, been a rapid wastage in supplies. Although the decline in production cannot be entirely attributed to waning supplies, it is undoubtedly true that the inability of the province to supply the high grades of lumber which were formerly produced has had a marked effect on lumber production. The number of establishments entering into production in 1920 was 576. It will readily be perceived, therefore, how widespread are the effects of such serious curtailment in production.

Of utmost importance in the present discussion is the extent to which the sawmills are dependent on spruce. Formerly, white and red pine and hemlock supplied large quantities of lumber, but the proportion of these has rapidly decreased, until the serious drain now falls on spruce. Spruce has, over the decade, furnished over 60 per cent of the entire lumber production. Only in two years has the cut of this species constituted less than 60 per cent. In other years it has varied from 63 to 67 per cent. When it is considered that seven of eighteen other species used are cut in appreciable amounts, it is at once clear that to maintain its high percentage cut, the amounts of spruce consumed are relatively very large.

SECTION 9.—THE TREND OF PULPWOOD BUSINESS IN NOVA SCOTIA

The official figures for pulpwood exports from the province, shown in tables IIa and IIc, are based on returns made by collectors of customs at the various ports of exit. It may be pointed out, however, that pulpwood originating in one province, and shipped through and cleared from a port in another province, is credited to the latter. The customs figures quoted in statistical reports do not, therefore, in all cases accurately represent the amounts of wood cut for export in the various provinces. It was found to be a hopeless task to go back over the decade and construct compensated tables for the adjustment of statistics. However, as a result of a study of this export business at the various ports of exit, it has been possible to adduce information of value in application to the export business. In Nova Scotia, during the past year or two, a small export business has developed in Cumberland and adjacent counties, and shipments of pulpwood, essentially poplar, have been made by rail through New Brunswick and cleared at McAdam Junction in the latter province. The amount so handled approximates 4,500 cords. Similarly, of the pulpwood shipped by vessel through the St. Lawrence waterway, small amounts (less than 100 cords) were cleared at ports in other provinces. Although, for the year for which the figures were secured, the aggregate was only 4,548 cords, it nevertheless constitutes a material percentage of Nova Scotia's export, and must therefore be considered.

Reference to the customs figures reveals a sharp increase in exports in 1919, this increase being maintained through the succeeding years. It was due largely to the acquirement and operation for export, by one company, of the large lease in Cape Breton Island. Exports from this property have not as yet reached the figures which the operating company anticipates; when all improvements have been completed the exports of this company alone are expected to run from 35,000 to 40,000 cords annually. However, export figures for the years indicated are as follows: 1919, 7,520; 1920, 28,500; 1921, 30,450; 1922, 32,400; 1923, nil. Some 36,000 cords are rossed and ready for shipment during the season of 1924. Comparison of these figures with total reported exports clearly indicated that, aside from small purchases which this company may have made from farmers, little or no other wood cut by farmers could have been exported through Nova Scotia ports in 1920 or 1921. In 1922 there was a small margin of 2,240 cords which was probably handled in this manner.

SESSIONAL PAPER No. 310

The census figures for operations in 1920, show that in that year the farmers of Nova Scotia disposed of 29,518 cords of pulpwood. In the same year the mills of the province consumed 24,595 cords, of which 18,703 cords was purchased, and the balance cut from limits owned by them. The difference between farmers' production and the amount purchased by mills, viz., 10,815 cords, would apparently represent the amount of farmers' wood available for export. This amount is considerably greater than the amounts shipped by rail through New Brunswick. It is, therefore, quite probable that the census returns for farmers' wood are excessive. It is nevertheless quite clear that, aside from activities of the Cape Breton firm, the farmers of the province are materially increasing their output of pulpwood. That this is true is clearly indicated by export figures for 1923, when 11,451 cords of pulpwood was exported through Nova Scotia ports and an additional 4,548 cords by rail through New Brunswick, bringing the total Nova Scotia export for that year to approximately 16,000 cords. In that year, the company operating in Cape Breton Island did not export any wood whatever; manifestly, therefore, the great bulk of the total export of 16,000 cords in 1920 was from the farmers' holdings.

That a considerable local market for farmers' wood already exists is evident from the statistics for pulpwood consumption. During the 6 year period, 1917 to 1922 inclusive, the pulp mills purchased approximately 80 per cent of their requirements. These mills, however, are not readily accessible to all parts of the province, and to this may be largely attributed the increased interest in the cutting of pulpwood for export.

Assuming an annual export of 35,000 cords from the Cape Breton property, and 15,000 cords from farmers' holdings, it may readily be expected that hereafter total exports from these two sources will approximate 50,000 cords. Aside from these, however, two other large American concerns have purchased, and are preparing for operation, large tracts of timber land. It may on this basis be anticipated that within a few years exports may reach a figure from 75,000 to 100,000 cords.

It is difficult to gauge what amount domestic requirements will reach. The ten year period, 1913 to 1922, shows an average yearly consumption of 21,126 cords. The later years of the decade, however, show higher figures, and 1922 shows a consumption of nearly 47,000 cords. It does seem reasonable to expect that, with the stabilization of conditions, from 45,000 to 50,000 cords would be consumed annually by local mills already established. As intimated, previously, another mill is expected to be operated at Sheet Harbour on the south coast. The wood supply for the mill projected will add very largely to domestic consumption.

Under these circumstances there is every reason to believe that, if the lumber industry is to be sustained, the annual requirements of spruce and balsam will be at least 500,000 cords.

SECTION 10—SUMMARY OF SITUATION—DURATION OF SUPPLIES

In the discussion of pulpwood resources, the amounts available, the annual consumption therefrom, and the probable amounts required, have been described in some detail. Simple mathematical division of the available supplies by the probable requirements would give us a good idea of the probable duration of supplies, were it not for the several variable factors which complicate the situation. On the one hand we have the annual growth, or increment, and, offsetting the latter in greater or lesser degree, the losses due to fire, insects and decay.

Unfortunately, from the data available—or rather, in the utter lack of any really reliable data—the Commission is not able to closely gauge the probable increment which has taken or is taking place; nor to ascertain from statistics available what the counteracting losses may have been. It is of paramount importance, however, that a few observations should be made regarding the subject, in order to dispel some of the misconceptions that are so prevalent. The matter will be treated with, so far as circumstances permit, and many of the general observations brought out in the discussion may be considered as having some application to other provinces in Eastern Canada.

Due to the fact that the climatic conditions in Nova Scotia favour the rapid germination of tree seeds, and that in more open situations, particularly on pastures and abandoned farms, tree growth is rather rapid, the most exaggerated ideas prevail regarding the rapidity of growth in the forest. In discussing the question of increment we must, in the main, confine ourselves to the areas where forests are to be perpetuated, i.e., on absolute forest soils; and to the conditions of relatively greater density which are required for the production of timber of quality suitable for the trades. Simply because a tree grown on relatively good soil in the open, where light conditions are most favourable, may develop to a large diameter in a comparatively few years, it must not by any means be assumed that similar growth is attained in the forest, for such is very far from being the case. Just as the character of man is in great measure the product of environment, so is the character of individual tree growth the product of site and density.

On this subject, we cannot, perhaps, do better than quote Fernow, on this continent the outstanding forester of his day, who, after making a study of forest conditions in Nova Scotia, discussed the question in part, as follows:—

“Most extravagant ideas exist as to the rate of growth of trees, observations of single trees growing in the open being taken as a basis to be translated into performance by whole acres of trees. The idea prevails that Nova Scotia spruce in the Nova Scotia climate is growing at an extraordinary rate. As a matter of fact, while it can be stated that the climate is most favourable to reproduction, i.e., to the establishment of young growth, the rate of growth of trees in the forest is not very different from the ordinary rate to be found in the New England States under similar conditions.

“Some 550 trees were analyzed as to their rate of diameter growth, and a number of sample plots were measured to arrive at a conception of growth conditions. From these measurements it appears that to produce a spruce tree, 12 inches in diameter on the stump, may require from fifty years for the most favoured trees, to one hundred and seventy years for trees which had for a long time to compete for light with their neighbours. The unusually rapid-growth trees are, to be sure, found only occasionally; the much more usual rapid growers require eighty to ninety years to make the 12-inch diameter. In other words, 1 inch of diameter is formed in the best average case in six to seven years; in the poorer conditions, in fourteen years. Older, stouter trees that have averaged twenty years in making one inch of diameter are not infrequent, and twelve years may, as in Sweden, be considered the average performance in the natural woods. That is to say, it took a hundred and forty to a hundred and fifty years, on the average, to grow the trees that are now being lumbered.

“A series of measurements were made on second growth trees, which are in more favourable light conditions, and, hence, make better growth. Some 250 trees of this description in various regions were analyzed. Here, as is to be expected, a very much better rate prevails owing to, and in proportion to, the light admitted. Fifty trees on an *old pasture* south of Springhill in Cumberland

SESSIONAL PAPER No. 310

county, ranging from thirty-five to fifty-nine years, had averaged one inch in five years, *i.e.*, a tree of 12-inch diameter on the stump was grown in sixty years. The same rate was found in *old pastures* in other localities. But in the forest, twenty trees in Colchester county, ranging in age from thirty-five to forty-eight years grew at the rate of 1 inch in seven years, making the 12-inch tree in eighty-five years. This may be assumed as a fair average rate for second growth trees.

"These statements refer to red spruce, which is the species most prominent in Nova Scotia forests. The white spruce, which forms rarely as much as 10 per cent, and usually not much more than 1 per cent, of the natural forest growth, is the species which occupies readily the abandoned pastures near the coast, and there, in the full enjoyment of light, grows as rapidly, or perhaps more rapidly, but into a poorer tree—a "ladder" tree, as, on account of the branches, a lumberman has called them. A few trees of this species that were measured, showed that they had developed at the rate of 1 inch in four years. Balsam fir, which in some parts is erroneously called white spruce, shows about the same rate of growth. One inch in five to six years seems the rate for young second growth of this species *on pastures*.

"White pine is the fastest grower; yet a group of 25 trees ranging from 63 to 84 years and averaging 68 years of age, evidently second growth, averaged only 11.4 inches in diameter. They had grown at the rate of 1 inch in six and two-thirds years.

"Some 26 trees of hemlock in the forest, an old stand on a first-class site near a stream, ranging from one hundred and seventy to two hundred and sixty-nine years, averaged two hundred and ten years, with an average diameter of 20 inches, made, therefore, 1 inch in ten years—a very good performance for this species."

While there is no desire to depreciate the possibilities of forest growth in Nova Scotia, there is, nevertheless, the rather obvious duty to shed as much light as possible upon actualities. No good purpose can be served by deluding oneself with the belief that the unregulated forests of Canada show an annual increment equal to that of intensively managed forests in Europe; in fact, it is just such delusions that must be removed from the public mind, if a true perspective of our forestry problems is to be acquired.

In some of the intensively managed forest areas of older countries, which have been under regulation for scores of years, rates of increment approximating $2\frac{1}{2}$ to 3 per cent may be attained; even so, such rates cannot be applied to their forest areas as a whole. On occasions, it has been suggested that percentages running from 1.25 to 1.5, or perhaps even a little higher, are about the limit which may be applied wholesale over large areas in such countries. Even these figures are only attained by the influence of the more favourable rates, secured in highly managed forests, upon the general average. Under such circumstances, it is manifestly futile to argue that in Canada we may apply higher figures—if as high—over large areas of very seriously depleted, and in some cases injuriously treated, forest land.

With the foregoing considerations in mind, and if, only for the purpose of reaching at least some conclusion, we adopt the arbitrary figure of 1 per cent, in Nova Scotia; rather liberally taking the total spruce-balsam stand of some 25 million cords (although there is certainly justification for not including all of it); it is perceived that the annual increment would be 250,000 cords. As against this, there is an annual consumption which, as previously explained, has been 400,000 cords, and the anticipated annual consumption, some 500,000 cords,—in the premises, a clear indication of serious depletion, through cutting alone.

There are, however, the other much more insidious agents in depletion,—fire, insects and fungus decay. Of fire, it may be said that there are all too abundant examples of the serious losses which the province has sustained. On the average, the fire menace cannot be considered to be great; further, on account of relative accessibility, the availability at close range of labour for fire control operations, and finally the character of the country, which offers many barriers to the spread of fire, the fire menace is quite susceptible of reasonable control, and latterly, there is evidence of much improvement in this direction. These facts notwithstanding, fire has been a serious factor in depletion, and is still very much to be reckoned with.

As for insects,—the mere fact that the province has not experienced an epidemic such as the budworm infestation of New Brunswick and Quebec, conduces to the popular belief that Nova Scotia has no serious forest insect problems. While there is perhaps no reasonable ground for thinking that an outbreak of this kind is impending, it is nevertheless a fact that insects do serious damage in the forests of that province, as they do in every province of the Dominion.

Finally, with regard to damage wrought in the forest by fungus diseases, while as yet it has not been the subject of very intensive study in that province, the loss from this source is an essential factor in depletion. For instance, the rot of balsam, a species which constitutes such a large part of the pulpwood stand, is something which must be reckoned with; and fungus decay is present in many other forms.

It is therefore evident that, aside from depletion through consumption, there are these other agents which may partially, totally, or more than counter-balance the forest increment due to growth. The precise state of balance which exists, it has not been possible to determine. It is firmly believed, however, that the increment is almost, if not more than, offset by these several agents of destruction; and that in calculating the probable duration of supplies, no allowance for growth may justifiably be made, unless and until such losses are more successfully curtailed.

On the assumption that these untoward losses may be so controlled that they will not on the average exceed the amount of annual increment in the forest, and if we are to be content with working on the extremely destructive theory of ultimate exhaustion, it would at first glance appear that the stand of pulpwood species might meet immediately anticipated requirements for a period of fifty years, at the end of which time the really useful commercial forest would be exhausted, and the pulpmills, sawmills and other industries, dependent thereon, would be scrapped. The calculation presupposes the free interchange in use of spruce and balsam in the industries, however. If we consider only the spruce—which as previously explained, furnishes the great bulk of the supplies—we might expect exhaustion of that species in from 30 to 35 years' time.

Except in so far as they may serve a temporary expedient,—on the one hand, to discount alarmist propaganda that predicts absolute exhaustion in the immediate future; on the other hand, to emphasize the need for more modern and more economic treatment of the forest resources—such methods of calculation reduce the problem to a state approaching absurdity. Manifestly, it would not be economically feasible, during the depletion period, to pool the annual cut among all the mills of the province on the basis of equality, for, by enhancing cost of production, this would render it impossible for the industry as a whole to compete with other sources of supply. On the other hand, if during the depletion stages, the principle of "survival of the fittest" is permitted to operate unhampered, there would be uninterrupted sequence in the closing down of manufactories,—a dwindling away of forest, forest industries, population and everything that constitutes thriving communities.

SESSIONAL PAPER No. 310

Were we to content ourselves with consideration of a question of such great national consequence upon the very material basis of "so-many-years" supply, and if the precise number of years computed were sufficient to remove any apprehension which may be entertained for the well-being of the present generation, our position would, with one or two important exceptions, be analogous to that of the man who, well along in life and without sufficient income to sustain him, decides upon the purchase of an annuity. The exceptions, however, render entirely untenable such a basis of consideration; (1) whereas the annuitant may have no responsibilities beyond his own security and comfort, the state has other definite and far-reaching obligations; (2) whereas the security and comfort of the annuitant may be thoroughly provided by such means, permitting any material part of the forest estate to fall into a condition of decadence is inevitably accompanied by disastrous results to the economic life of the district so mistreated, even in the present generation.

Too frequently, the suggestion is offered that when the softwoods are gone, we may resort to the use of hardwoods. Taking the problem on that basis, it may be stated that more and better hardwoods can be grown farther south, much closer to the markets that mean so much to eastern Canada. In any case, the demand of the world to-day is for softwoods: Australia, with her extensive gum forests, imports softwoods from the Pacific coast; India, with hardwoods far surpassing anything that we can produce, does likewise; European countries spend stupendous sums in the protection, maintenance and development of coniferous forests, when hardwoods are much easier to propagate. With a country by nature adapted and predestined to the production of softwoods, there is scant comfort, therefore, in assuming that Canada can in any material way compete in hardwood markets of the world. Nevertheless, it is greatly to be hoped that ere long more extensive uses may be found for our hardwoods; if this can only be brought about, paradoxical though it may seem, it will in the final analysis be profitable to operate hardwoods at apparent loss, if thereby we can prevent the further encroachment of hardwoods upon the areas of coniferous timber, and by that means perpetuate the more valuable and more necessary softwoods. In agriculture, the operation of weeding is a laborious one, and enters very largely into the cost of producing crops; the farmer who will not pull his weeds, simply because there is no sale for weeds, is destined to failure in his vocation.

So far as duration or continuation of supplies is concerned, there are two outstanding facts in the forestry situation of Nova Scotia; (1) that if the losses by fire, insects, and decay can be and are successfully counteracted, it will make possible the utilization of forest increment which is now wasted; (2) that, even with the removal or essential reduction of these losses, and consequent addition of annual growth to the credit side of the forest ledger, consumption on the present scale involves continuous depletion, and portends ultimate exhaustion, unless steps be taken to so handle and develop the forest that the annual increment may be increased.

It is not the extent or consumption of the present pulp industry that contributes essentially to the constant depletion which has taken place, and is still taking place,—for, with the area available for growing timber, the province most assuredly should be able to support this and other forms of industry; rather, net depletion results from all of the losses consequent upon failure to adequately protect, and failure to handle the forest on a basis which will take full advantage of the growth that is possible in the province.

CHAPTER III—NEW BRUNSWICK

During the course of its early history New Brunswick experienced several methods of land disposal. Firstly, the old French seignoiries; subsequently, grants to officers of the Royal Service. For failure to comply with conditions, however, these lands all reverted to the Crown. There then followed a lengthy period during which considerable areas were disposed of by sale to companies, groups, and individuals, ostensibly for settlement purposes. Finally, during the period of initial railroad development, 1860 to 1880, large areas were granted as subsidies to railway companies. Since that time no large grants or sales have been made. At present, land disposal is confined to small sales of isolated lots, and to grants up to 100 acres in extent, for farming purposes, made under provisions of the Labour Act.

Arising from land disposal made under these various methods, the present situation is that a little less than one-half of the forest area is alienated in fee-simple.

SECTION 1.—TOTAL PULPWOOD RESOURCES

Upon reference to Table I it will be seen that the total forest area is 21,476 square miles, 76.9 per cent of the land area of the province. The total stand of pulpwood is 37,672,646 cords, including spruce, balsam,* hemlock, jackpine** and poplar. The amount of hemlock in the province is relatively insignificant, and, as it is rather urgently required for saw-timber supplies, it may be eliminated from further consideration. Jackpine is not found in large quantities, and the fact that its use for railway ties will probably increase materially, as a result of the development of the wood-preserving industry in the province, justifies the elimination of the greater part of it from serious consideration as pulpwood. Poplar is present in considerable quantities, and if the species were used to any extent by local industries, it might be considered to be of relatively great importance. It is not so used, however, and its present importance as pulpwood is confined to export.

Making a small allowance for jackpine, but otherwise basing discussion upon the supplies of spruce and balsam available, the province has supplies of these species to the extent of approximately 33 million cords. Of this quantity, about 80 per cent may be considered as merchantable and accessible, or liable to become so in the future. So far as transportation is concerned, it is conceded that all parts of the province are relatively accessible; that is, there are few areas from which timber could not be removed by some method or other. If, therefore, all of the timber could be rated merchantable in other respects, the total stand of 33 million cords might be considered as available. There are, however, numerous areas where the timber growth is so stunted, and where it is so sparsely scattered, that it is not reasonable to anticipate that natural regeneration will, within any reasonable time, provide merchantable stands of timber either for pulpwood or lumber. The accessible and merchantable pulpwood timber, therefore, is 26,600,000 cords of spruce and balsam; from this stand, both pulpwood and lumber supplies of these species must be drawn.

SECTION 2.—PULPWOOD UNDER EXCLUSIVE CONTROL OF THE PROVINCE

While in the province of New Brunswick timber lands have not been permanently alienated to nearly the same extent as is the case in Nova Scotia, the great bulk of the forest area is either alienated in fee simple, or the timber cutting rights disposed of under long-term license or lease. Only some 1,680

*Balsam is locally referred to as "fir" in New Brunswick.

**Jackpine is known locally as "princess" pine.

SESSIONAL PAPER No. 310

square miles of timber land, 7.8 per cent of the forest area, remains unalienated in any form whatsoever. The timber content of these unalienated lands is, however, very low, being estimated at 537,600 cords. To a very great extent this timber is widely scattered over the area, in amounts which will not permit of successful exploitation either for sawmill purposes or for pulp operations.

SECTION 3.—PULPWOOD UNDER REGULATIVE CONTROL OF THE PROVINCE

An area of 9,121 square miles, comprising approximately 42.5 per cent of the forest area has been disposed of under license or lease to lumbermen, pulp companies, and others interested in timber lands. This area is estimated to contain some 18,027,000 cords of pulpwood, about 90 per cent of which is spruce and balsam. Over all of this timber, the provincial authorities are in a position to exercise control, both in regard to requirements for local manufacture, and in restrictions and regulation of methods of cutting. As a matter of fact the provincial regulations do prescribe that softwood timber from licensed Crown lands shall be manufactured within the province; also, there are serious cutting restrictions as to size, particularly in the case of spruce. It is necessary to state, further, that by virtue of diameter limits now in effect for spruce, approximately 5.7 million cords of this species—about one-half of the amount of spruce available on Crown lands—is under prohibition against cutting. However, as this timber grows to legal sizes, the restriction automatically vanishes.

SECTION 4.—PULPWOOD ON PRIVATELY OWNED LANDS

Altogether, some 10,675 square miles, 49.7 per cent of the total forest area is alienated in fee simple. These private lands carry pulpwood to the extent of approximately 19.1 million cords, slightly more than half of the total stand for the province. Here also, spruce and balsam constitute about 90 per cent of the stand. It thus appears that a little more than one-half of the pulpwood resources have passed entirely beyond control by the province, both in regulation as to the methods under which it shall be operated, and in restrictions as to location of manufacture.

SECTION 5.—OWNERSHIP OF PRIVATE LANDS AND PULPWOOD RESOURCES

It has been impossible to secure accurate or complete figures covering all of the alienated forest area. It has been ascertained, however, that of the total private forest amounting to 10,675 square miles, an area of 4,323 square miles (40.5 per cent) is held in parcels of 1,000 acres and upwards. The remainder, 6,352 square miles, comprises the smaller holdings, less than 1,000 acres in extent, the great bulk of which is undoubtedly held by residents of the province.

Analysis of ownership of the large holdings (4,323 square miles) reveals interesting data. In the first place, 4,088 square miles (nearly 95 per cent) is held by corporations or companies, as against only 235 square miles held by individuals. This condition, combined with the fact that a large part of the licensed lands are controlled by corporations or companies, clearly indicates the great extent to which the operators might be expected to exert influence upon the forest policy of the province; it assuredly emphasizes the necessity for close co-operation between the provincial authorities and the timber operators in the development of an adequate policy for the management of forest lands.

As regards the degree of local and foreign control,—of large holdings 3,053 square miles (about 70 per cent) of the area is controlled by Canadian corpora-

tions, companies and individuals, while the other 30 per cent, or 1,270 square miles, is controlled by foreign interests, essentially American. It is true that American interests in licensed lands are also very heavy, but, so far as outright control is concerned, foreign ownership applies to slightly less than 6 per cent of the area of the larger timber holdings in the province. An area of approximately 846 square miles, 3.9 per cent of the total forest, is owned by three American companies; of the latter, one company manufactures in Canada part of the product of its timber lands, while the other two export entirely to the United States.

It is worthy of note that over 54 per cent of the larger private holdings is in the hands of the New Brunswick Railway Company, a Canadian concern. The holdings of this one company comprise over 10 per cent of the total forest area of the province.

SECTION 6.—SUMMARY RE PROVINCIAL CONTROL OF MANUFACTURE

From the foregoing discussion it is manifestly the case that, even lacking the power to enforce manufacturing conditions over timber on privately owned lands, the province does have such control over about one-half of the total pulpwood resources; in fact, legislation requiring local manufacture is now on the statute books.

SECTION 7.—CONSUMPTION OF TIMBER IN NEW BRUNSWICK

Table I gives the total stand of softwood saw-timber, available under present diameter limits, as 9,073,710 M feet, board measure; this amount including spruce, balsam, hemlock and jackpine of saw-log size, as well as all other conifers found in the province. The saw-timber estimates for pulpwood conifers are as follows:—

Spruce.. . . .	5,446,130	M.B.F.
Balsam.. . . .	1,554,580	"
Jackpine.. . . .	135,000	"
Hemlock.. . . .	135,000	"
Total.. . . .	7,270,710	"

There is, therefore, approximately 1.8 billion feet, board measure, of other softwoods, consisting essentially in red and white pine (870 million), cedar (925 million) and a small amount of tamarac. The 7 billion feet of spruce and balsam included in the saw-timber figures, converted to cubic measure represents 14 million cords. Aside from timber of saw-log size, therefore, the net amount of spruce and balsam pulpwood is approximately 19,600,000 cords. With these facts before us, it is appropriate to analyse statistics of wood consumption, in order that conclusions may be drawn as to the extent to which supplies available may be expected to meet the requirements for both pulp and lumber manufacture.

Table III gives the figures for pulpwood consumption over the decade 1913 to 1922. Very clearly indicated indeed, is the fact that species other than spruce and balsam furnish only a trifling part of the pulpwood used. Table IIIa includes figures for the amounts of spruce and balsam sawn into lumber.

SESSIONAL PAPER No. 310

TABLE III—LOCAL CONSUMPTION OF WOODS FOR PULP MANUFACTURE—
NEW BRUNSWICK
CORDS

Year	Spruce	Balsam Fir	Other Species	Total
1913.....	48,037	5,084		53,121
1914.....	41,895	7,444		49,339
1915.....	92,060	23,782		115,842
1916.....	63,489	16,105		79,594
1917.....	85,941	17,539	2,106	105,586
1918.....	79,141	30,992		110,133
1919.....	111,425	29,182		140,607
1920.....	30,989	148,421	1,313	180,723
1921.....	62,439	58,671		121,110
1922.....	102,483	102,482		204,965
Total.....	717,899	439,702	3,419	1,161,020

TABLE IIIA—SPRUCE AND BALSAM MANUFACTURED INTO LUMBER—NEW
BRUNSWICK
M Board Feet

Year	Spruce	Balsam	Total
1913.....	316,703	17,311	334,014
1914.....	315,505	23,178	338,683
1915.....	519,699	45,659	565,358
1916.....	426,544	25,551	452,095
1917.....	457,746	36,707	494,453
1918.....	268,150	38,689	306,839
1919.....	337,025	77,735	414,760
1920.....	368,103	53,150	421,253
1921.....	208,203	23,568	231,771
1922.....	303,877	30,854	334,731
Total.....	3,521,555	372,402	3,893,957

NOTE.—Complete figures for lumber production from all species will be found in Table IIIE.

By consolidation of consumption figures, as given in Tables III and IIIA, the figures in Table IIIb, for total consumption of spruce and balsam in the pulp and lumber industries, are derived.

TABLE IIIb.—AMOUNT OF SPRUCE AND BALSAM CONSUMED IN MANUFACTURE
OF LUMBER AND PULP—NEW BRUNSWICK
Expressed in Cords — 500 B. ft. = 1 cord

Year	Spruce	Balsam	Total
1913.....	681,443	39,706	721,149
1914.....	672,905	53,800	726,705
1915.....	1,131,458	115,100	1,246,558
1916.....	916,577	67,207	983,784
1917.....	1,001,433	90,953	1,092,386
1918.....	615,441	108,370	723,811
1919.....	785,475	184,652	970,127
1920.....	767,195	254,721	1,021,916
1921.....	478,845	105,807	584,652
1922.....	710,227	164,190	874,417
Total, 10 years.....	7,760,999	1,184,506	8,945,505
Average.....	776,099	118,451	894,550

It is thus shown that the average annual consumption of the two species was 894,550 cords; but this does not represent the total cut of these species, as there still remains to be included the wood cut for export, and for use in other directions.

TABLE IIIc—EXPORT OF PULPWOOD FROM NEW BRUNSWICK

Cords	
Year	Exports
1913.....	141,553
1914.....	143,787
1915.....	119,896
1916.....	127,730
1917.....	156,255
1918.....	263,907
1919.....	193,354
1920.....	185,637
1921.....	213,266
1922.....	144,639
Total.....	1,690,024
Yearly average, 1913-22.....	169,002

NOTE:—These figures include all species.

In view of the lack of 1923 figures for domestic consumption and to preserve uniformity in the tables, Table IIIc, for exports, is drafted for the same decade as that of Tables III and IIIa. Export figures for 1923 are available, however, and it is interesting to note that the total exports for that year, through New Brunswick ports, was 173,828 cords. This figure, it will be observed, is very close indeed to the average of 169,002 cords established for the decade.

It has previously been explained that a certain amount of pulpwood originating in Nova Scotia is exported through McAdam Junction; and to that extent official export figures for New Brunswick are swelled. On the other hand, a considerable amount of wood originating in New Brunswick is exported through Quebec and Ontario ports of exit. Records clearly indicate that the latter shipments much more than offset the amount of pulpwood coming from Nova Scotia. In the period over which this interprovincial traffic was studied, it was established that the net additional export with which New Brunswick must be charged is approximately 6,000 cords. Applying this figure to the average of official exports, it may be concluded that New Brunswick net exports now average 175,000 cords per year.

Unfortunately, it is impossible to state accurately the proportion of total exports which consist of poplar, as against spruce and balsam. Basing conclusions upon evidence submitted, however, it is thought that at least twenty per cent of the total is poplar. On this premise, the exports of spruce and balsam amount to 140,000 cords.

Before attempting summation of spruce and balsam consumption, it is necessary to consider the use of these species for miscellaneous purposes. Census figures indicate that in 1920 the farms of New Brunswick supplied the following wood products:—

Fuelwood.....	427,046 cords
Fence posts.....	218,386 pcs.
Rails.....	315,756 “
Railway ties.....	249,825 “

Although the amounts of the various species used in the foregoing products are not available, as is the case of Nova Scotia, considerable amounts of spruce are consumed for these purposes. It is quite safe to assume, therefore, that at least twenty to twenty-five thousand cords of spruce and balsam are so used. In the mines of the province a limited amount of the species is used for props. We therefore take 26,000 cords as the total consumption of spruce and balsam in all of these miscellaneous uses.

SESSIONAL PAPER No. 310

Another use to which very large quantities of wood are put is in lath manufacture. In lath production the province of New Brunswick ranks second only to Ontario. Over the 7 year period, 1916-1922, lath production averaged approximately 200 million per year, of which between 75 and 80 per cent were manufactured from spruce. This gives a total average consumption of spruce for this purpose of approximately 65,000 cords. Large quantities of laths are manufactured from slabs, but the lath industry in New Brunswick has been developed to such extremes that large quantities of timber are cut specifically for this purpose. The cutting of timber for lath manufacture, while providing indeed for close utilization, is nevertheless exceedingly destructive, as timber lands are practically stripped. By reason of increased markets for this product, it is quite certain that figures for 1923 and 1924 will show lath manufacture far in excess of the average previously quoted. It is therefore quite safe to say that at least 40,000 cords of spruce timber is consumed per year in lath manufacture. Although it is believed that a certain portion of this amount may be balsam, the estimate is nevertheless based directly upon the affirmed returns of operators.

The summation of figures previously arrived at for pulp and lumber consumption, for exports, and for miscellaneous uses, leads to the conclusion that the average annual consumption of spruce and balsam in the New Brunswick forests is approximately 1,100,000 cords. While of wood consumed in pulp manufacture, the proportion of balsam used in New Brunswick is very much higher than in other provinces (due to the large quantities of this species present, and to the efforts which have been made to salvage the budworm infected wood) this is far more than offset by the much more extensive use of spruce in lumber manufacture, and in other uses. Table IIIb indicates quite clearly that over 86 per cent of the wood used in combined pulp and lumber manufacture is spruce. This percentage is further increased when lath and miscellaneous products are considered. It is therefore clear that with a total accessible and merchantable spruce supply of some 19.4 million cords, the annual consumption of this species is at least 900,000 cords.

SECTION 8—THE EXTENT OF PULP AND SAW-MILL INDUSTRIES

While development of the pulp industry in New Brunswick has not been phenomenal, it has nevertheless been fairly consistent. This fact is clearly indicated in Table IIIc. The number of mills operating over a period of years is five, and, until 1923, when paper was made for the first time at Bathurst, the output has been entirely of various classes of pulp, mostly for export. The production of groundwood has been fairly consistent over the decade, much greater fluctuations being evident in chemical pulp.

TABLE IIIc—PULP PRODUCTION—NEW BRUNSWICK
Pulp Production—tons.

Year	Ground-wood	Bleached Sulphite	Unbleached Sulphite	Sulphate	Total including screenings, etc.
1913.....	6,702	20,209		3,000	29,911
1914.....	4,319	21,510		1,000	26,829
1915.....	8,344	53,749			62,093
1916.....	7,154	36,220			43,374
1917.....	7,245	43,009		8,086	58,340
1918.....	6,463	30,766		29,390	66,619
1919.....	6,447	12,833	43,779	12,127	75,186
1920.....	6,225	31,476	37,997	12,475	89,069
1921.....	5,220	29,113	19,197	7,774	61,810
1922.....	6,879	47,898	27,221	16,583	99,750

NOTE.—For the last three years, the figures given under the "Total" column include screenings; consequently the figures are greater than the aggregate of totals for groundwood, sulphite and sulphate.

14-15 GEORGE V, A. 1924

That the industry has not developed to an even greater extent, may in part be attributed to the fact that adequate power development is rather lacking. Grand Falls on the St. John River is an excellent power site, and, if certain difficulties relating to storage can be obviated, will add materially to the power available for use within the province, thereby making possible a greater development in the pulp and paper industry. There is to be considered, however, the very serious question of timber supply. Unless the consumption for lumber and lath be seriously curtailed, it is altogether doubtful that consumption for pulp can be materially increased unless methods for the use of species other than spruce and balsam are devised and applied. To the lack of developed power, also, is due the fact that a greater quantity of paper is not produced within the province. A beginning has been made, however, and increased production of paper only awaits more adequate supply of power.

In Table IIIe will be found the figures for lumber production in the province. The peak year was 1915, relatively high production being maintained through 1916 and 1917. A falling-off occurred in 1918, with evidence of recovery through 1919 and 1920. The following two years, the last of the decade, showed the lowest production of the entire period; in fact, from a production standpoint 1921 was one of the most serious which the industry has faced for many years, and the year 1922 indicates only partial recovery. In the individual years of the decade, spruce production has varied in percentage of total cut, from 61 per cent to 84 per cent; in only two years has it been below 70 per cent, and over the entire decade it has furnished 76 per cent of the total cut. Although the province has always been more noted for its spruce, in by-gone years there were also to be found large amounts of excellent white pine. The supplies of the latter species have been very seriously reduced, however, and in only one year of the decade did production exceed 8 per cent of the total lumber production. Hemlock production has been even smaller in amount, and this species is rapidly approaching extinction as a commercial wood.

TABLE IIIe—NEW BRUNSWICK LUMBER PRODUCTION, 1913 TO 1922 INCLUSIVE BY KINDS OF WOOD, QUANTITY CUT AND VALUE

Kinds of Wood	1913		1914		1915		1916		1917	
	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value
		\$		\$		\$		\$		\$
Spruce.....	316,703	4,618,212	315,505	4,863,010	519,699	8,137,717	426,544	6,923,496	457,746	8,518,085
White Pine.....	31,287	545,847	23,924	556,649	35,507	658,278	32,525	638,764	38,161	865,690
Hemlock.....	21,952	271,736	26,189	353,549	14,922	192,965	9,358	123,426	29,192	533,895
Balsam Fir.....	17,311	162,160	23,17	324,718	45,659	673,114	25,551	361,951	36,707	665,01
Birch.....	5,749	84,622	8,031	121,430	8,356	116,073	10,199	187,385	4,100	108,469
Cedar.....	2,154	19,80*	8,936	84,724	5,531	73,342	5,566	54,807	9,258	148,619
Maple.....	1,945	27,707	1,839	32,582	1,393	19,176	1,980	37,000	291	6,120
Beech.....	838	11,850	51*	7,118	214	2,527	511	6,567	48	965
Poplar (Aspen).....	641	6,731	735	6,910	850	9,948	127	1,818	127	2,179
Jack Pine.....	358	4,882	400	5,625	559	7,366	442	5,831	277	4,304
Red Pine.....	201	2,959	431	6,217	586	8,279	390	6,051	5,555	121,026
Ash.....	32	866	20	332	32	515	37	735	13	243
Basswood.....	21	345	6	120	30	437	356	5,112	1,076	21,880
Poplar (Balsam).....	13	156	86	1,032	5	70	1	15		
Tamarack.....	12	318	2	40	67	885	11	185	806	13,880
Butternut.....	12	240	1	20			1	15		
Oak.....	11	241	4	115			5	250	1	40
Elm.....	7	112	6	102	6	90	2*	535	49	1,162
Poplar (Cottonwood).....					102	1,420	21	256		
Cherry.....							6	13*		
Other Kinds.....									1,660	32,500
Custom Sawing.....									8,430	280,029
Poplar (All Kinds).....										
	399,247	5,758,849	414,801	6,374,293	633,518	9,902,20*	513,655	8,384,397	593,497	11,324,101

SESSIONAL PAPER No. 310

TABLE IIIe—NEW BRUNSWICK LUMBER PRODUCTION, 1913 TO 1922, ETC.—*Con.*

Kinds of Wood	1913		1919		1920		1921		1922	
	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value
		\$		\$		\$		\$		\$
Spruce.....	268,150	7,409,857	337,025	11,385,733	368,103	13,229,697	208,203	6,100,012	303,877	7,560,499
White Pine.....	70,349	2,195,303	30,099	1,171,690	23,524	953,438	18,884	557,719	14,420	450,217
Hemlock.....	19,162	437,798	11,902	333,826	25,865	977,747	9,460	249,687	5,052	112,588
Balsam Fir.....	38,689	1,031,611	77,735	2,526,872	53,150	1,730,233	23,565	619,842	30,864	635,657
Birch.....	13,409	403,548	6,565	255,838	4,635	157,741	5,311	171,909	2,624	66,804
Cedar.....	16,457	351,483	6,139	183,254	20,145	715,848	424	11,181	1,369	34,818
Maple.....	587	10,932	964	28,546	1,642	61,780	1,125	33,431	169	5,134
Beech.....	60	1,410	107	2,785	27	1,063	321	8,790	32	913
Poplar (Aspen).....	51	1,082	160	3,604	.....	.....	.....	.....	.....	.....
Jack Pine.....	157	3,936	2,486	72,467	1,727	54,863	588	11,750	23	483
Red Pine.....	998	25,321	294	8,974	3,243	101,937	315	10,910	462	11,826
Ash.....	.....	.....	7	321	3	112	4	95	16	515
Basswood.....	129	4,092	20	480	226	6,944	113	3,351	46	1,540
Poplar (Balsam).....	7	120	400	12,000	.....	.....	.....	.....	.....	.....
Tamarack.....	1,621	51,724	5	105	8,593	268,965	34	600	795	15,110
Butternut.....	.....	.....	10	250	5	156	13	320	.....	.....
Oak.....	.....	.....	2	80	.....	.....	.....	.....	.....	.....
Elm.....	10	270	21	435	6	183	861	17,243	13	340
Poplar (Cottonwood).....	.....	.....	8	240	.....	.....	.....	.....	4	80
Cherry.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Other Kinds.....	1,837	45,780	2,519	48,764	4,678	101,880	632	9,315	274	4,340
Custom Sawing.....	10,952	215,045	21,125	441,213	.....	.....	.....	.....	.....	.....
Poplar (All Kinds).....	.....	.....	.....	.....	213	6,539	127	2,467	.....	.....
	442,625	12,189,312	497,593	16,477,477	515,785	18,374,126	269,933	7,810,622	360,030	8,906,894

The figures in Table IIIe and remarks of the foregoing text clearly indicate that a serious situation faces the wood-using industries of New Brunswick. At one time the province contained very large supplies of excellent coniferous timber, but, owing to continued and rapid use, through several generations, and as a result of fire and insect losses, there has been such a serious diminution of softwood supplies available as to provoke the utmost concern. Geographically, the province is most favourably situated to compete in timber supply in foreign markets, both on this continent and in Europe; growth conditions also are favourable. If the province is to continue to compete in foreign lumber markets, however, high quality must be maintained. With continued serious reduction in the sizes of logs—and consequently of the better grades of lumber—experienced over the last decade, the province cannot for very much longer hope to compete with the much superior product of the Pacific Coast, which latter offers serious competition even now.

It is also evident that, without actual increase in the timber grown, lumber and pulp production cannot both be permanently maintained on the present scale, and some economic adjustment in consumption of the two industries is imperative.

SECTION 9—TREND OF THE PULPWOOD BUSINESS IN NEW BRUNSWICK

As indicated in Table IIIc, the average yearly export of pulpwood from 1913 to 1922 was 169,002 cords. In 1923, when pulpwood exports for the entire Dominion increased approximately 38 per cent over those of the previous year, it might have been expected that New Brunswick exports would show proportionate increase. Such was not the case, however, the actual increase in this province being less than 22 per cent over 1922. Even this figure is misleading, however, for the 1922 exports from the province were themselves lower in amount than they had been for six years; in fact they were but little greater

than the individual exports of the years 1913 and 1914. A more satisfactory comparison may be made, therefore, to the average annual export of 169,002 cords; this demonstrates that 1923 exports were not quite 3 per cent greater than the average for the decade. Unfortunately, figures for domestic consumption in the year 1923 are not available, but taking those for 1922, namely 204,965 cords, it is at once perceived that the local consumption of pulpwood in that year was over 76 per cent greater than the average annual consumption for the decade; indeed, it was greater, by 13 per cent, than the consumption of any previous year in the history of the industry. It is therefore evident that, in contradistinction to Nova Scotia, where increased drain on the pulpwood resources was in the main due to exports of raw wood, in New Brunswick it has been due to greater domestic production of pulp.

It is of interest to study the source of supplies of pulpwood for both export and domestic use, although this can only be done for the year covered by the Census, namely 1920. In that year, New Brunswick pulp manufacturers cut 95,618 cords from their own limits, as against 85,105 cords purchased from outsiders. On the other hand, the farmers of the province produced and sold 196,991 cords. If it were assumed that all wood purchased by the mills was derived from the farms, it is evident that the farmers' cut for export was 111,886 cords,—the smaller the proportion of farmers' wood purchased by the local mills, the greater would be the figure for farm wood exported. While it is difficult to hazard a specific estimate as to the amount of farmers' wood actually exported, it is quite reasonable to assume that some of the wood purchased by local mills was secured from owners or operators of timber lands other than farm lands. Taking the latter amount at 10 per cent of total purchases, this would increase the figure for farmers' exports from 111,886 to 120,397 cords. Now, the total exports for that year amounted to 185,637 cords. Consequently, there would be left some 65,240 cords as representing the exports of timberland owners interested in selling wood in the United States. Aside from local timber operators cutting wood for the export trade, there are several companies which, while operating under Canadian charter, are controlled by foreign capital, and are cutting wood extensively for use in mills in the United States. After careful study of the situation, it seems quite reasonable to ascribe this quota of 65,240 cords of exported wood to operators in these two categories (it was probably a little higher). On these premises, farmers' wood supplied approximately 65 per cent of the exports, the other 35 per cent coming from Canadian and American holders of timberlands interested in export. If it be argued that farmers supplied all the wood purchased by local mills, they still must have furnished over 60 per cent of the export wood. Manifestly, therefore, the conclusion is that the farmers supplied between 60 and 65 per cent of the wood exported in that year.

It has previously been intimated that of a total of 180,723 cords of wood used locally for pulp manufacture in 1920, 85,105 cords, or 47 per cent, was purchased by the mill operators, and that the great bulk of this came from farmers. Over a six year period, 1917-1922, the percentage of wood so purchased was 43 per cent. In the first three years of this period the percentages of purchased wood were relatively very much smaller, while in 1921 it was over 61 per cent, and in 1922 it was 57½ per cent. These facts clearly show the extent to which New Brunswick mills depend upon purchased wood. It is also made abundantly clear that there exists in the province a very considerable market for pulpwood which is already taken advantage of to a material extent by local wood cutters.

With some uncertainty surrounding the possibilities of further power development, it is difficult to forecast future development of the industry. The latest capacity figures for mills already established are those of 1922, when

SESSIONAL PAPER No. 310

the total for all classes of pulp was 110,000 tons. In that year the total output in pulp of all grades was 104,822 tons,—95 per cent of total capacity. In attaining this performance 204,020 cords of wood was consumed. If capacities were to remain stationary, probably the highest consumption of wood might not exceed some 215,000 cords. As improvements are made, however, capacities are correspondingly increased. If additional power becomes available, it is a certainty that the production of groundwood pulp will be increased, and this apparently is the most pressing economic need to-day. Whereas, every other pulp producing province in the Dominion has groundwood capacity much greater than for the manufacture of chemical pulp, in New Brunswick the reverse is true; in fact, in the latter province chemical pulp capacities are 12 or 13 times greater, and actual production of chemical pulp over 14 times greater than of groundwood. It is the inadequacy of power supply at the present time which prevents further manufacture of groundwood, and thereby retards development and prevents attainment of the higher aims of the manufacturer—the manufacture of paper, or other final products of wood fibre. While in order to build up and stabilize her industry it appears to be of utmost importance to increase production of groundwood, it seems to be certain that the province cannot very well stand further development in the manufacture of chemical pulp unless processes for the use of hardwoods are developed. In the chemical processes approximately two cords of wood are required for the production of one ton of fibre, whereas, for mechanical pulp one cord suffices; in view of the shortage of supplies, this in itself indicates the desirability of directing effort toward increase in the amount of groundwood.

If plans of the New Brunswick Electric Power Commission, which embrace a comprehensive scheme of development and transmission, are brought to successful fruition, there is every hope that the production of groundwood pulp will materially increase, and that the complete cycle in manufacture to paper or other finished products of wood fibre will be attained. In this manner, a greater proportion of the wood grown in the province would be utilized to sustain home industries than is possible under conditions at present obtaining. The fact must not be lost sight of, however, that spruce supplies will not permit of great expansion of the pulp and paper industry without curtailment of lumbering operations. There is positively no hope of maintaining an average annual production of 350 million feet of spruce saw-timber, and at the same time developing the pulp industry to greater capacity.

As for pulpwood exports, while there has been no alarming increase, it is also doubtful whether they may be expected to decrease under conditions existing. Wood cut from privately owned timberlands is freely exported, while unalienated and licensed Crown timber is restricted from export by reason of manufacturing requirements which are essential features of the licenses or sales.

SECTION 10.—SUMMARY OF SITUATION: DURATION OF SUPPLIES

While it is not proposed to repeat in detail the general arguments propounded in Chapter II, section 10, many of the statements made therein apply with equal, or perhaps with even greater force, in New Brunswick,* consequently, it is important that specific treatment should be accorded the situation in this province.

To begin with, there is the available spruce-balsam stand approximating 26.6 million cords, against which may be placed the annual consumption of 1.1 million cords. Eliminating, for the moment, the annual increment, and also the counteracting losses through fire, insects, and decay, it would appear that upon

* See also Section 10, Chapter II.

the "ultimate exhaustion" basis the supplies might suffice for about 24 years. Here again, however, there is presumed a free interchange in use of spruce and balsam in the two industries. Taking spruce alone, of which there is an available stand approximating 19.4 million cords, and an annual consumption of .9 million cords, the supply would appear sufficient for about 21 years.

In dealing with the question of increment, it may be stated that conditions for regeneration are on the whole quite favourable in New Brunswick, but there is no basis for a conclusion that the rate of growth, following germination, exceeds that of Nova Scotia. True, in certain favoured localities such as the Bay of Fundy coast, better growth is secured; but taking the province as a whole, the rate of one per cent, which was applied for purpose of analysis in Nova Scotia, would seem to be justified for application to New Brunswick conditions. Thus, with a total spruce-balsam stand of approximately 33 million cords, the annual increment would be some 330,000 cords,—very much lower, it will be observed, than the annual consumption of the two species.

On the other hand, the province has suffered stupendous losses from insects and fire; undoubtedly, also, the loss through fungi has been considerable, because unhealthy forest conditions resulting from the attacks of insects and fire materially increase susceptibility to these other tree diseases.

For several years fires have been severe, culminating in 1923, when the resultant losses were the worst that have been experienced since the great Miramichi fire of 1825. In 1923, "the total damage to standing timber, not including injury to the young trees and to the soil, based on present stumpage values, amounts to over three and one-half million dollars—a total loss, except for the comparatively small amounts which it is possible to salvage before the wood-boring beetles render the wood useless for saw-logs. The timber land burned consisted mainly of some of the best growing softwood forests in the province. . . . The (merchantable) timber killed by fire, including both hard and softwoods, is placed at 1,100,000,000 feet."*

Manifestly, it would exaggerate the situation out of all measure to base consideration of annual losses on those of one very serious year; taking, however, the past six years, it appears that the average annual loss of merchantable timber of all species has been approximately 520,000 cords, *plus* a large amount of young growth the figures for which are not available. Just what proportion of this loss was incurred by pulpwood species, it is impossible to say, but it is quite reasonable to assume that by reason of the high inflammability of coniferous species, as compared to the much lower danger in hardwoods, the average annual loss of spruce and balsam has been probably not less than 400,000 cords, particularly if the additional areas of young growth of these species are considered.

While no exact figures for the timber destroyed by the budworm are available, estimates of the spruce and balsam lost through the attacks of these insects are estimated variously from ten to twenty million cords. Taking the period, from the time the insect became epidemic, until the present—about 10 years—and using only the lower figure for total losses, the average annual loss from this source alone has been at least one million cords,—probably greater.

It is not possible to give any figure for the loss through fungus decay, no complete studies having been attempted. Setting this loss aside, however, it appears that New Brunswick forests have been subject to spruce and balsam depletion at the rate of at least 2½ million cords per year; that is, these species have been subject to depletion, through utilization and loss, about seven times as great as annual growth. Putting it another way,—aside from consumption in the industries, average losses in this province have been about four times the annual increment.

* Report of Chief Forester, New Brunswick, 1923.

SESSIONAL PAPER No. 310

The budworm epidemic having subsided, there is no reason (unless some other visitation is suffered) to anticipate continuance of this exceptionally heavy drain on the supplies. Insects and fungi are, however, omnipresent, and material losses therefrom are always in evidence. Combined with average fire losses (unless the latter be materially reduced as a result of rigorous measures to that end) it is quite apparent that they will continue to exceed annual increment to a material extent.

The foregoing remarks lead to the inevitable conclusion that the figures, arrived at by simple division of the stand by average consumption, give altogether too optimistic results. The large annual cut from the stands available is in no way counteracted by annual increment, because the latter is itself far more than offset by the other losses.

These deductions surely emphasize the conclusions arrived at in Section 8, namely, that "without actual increase in the timber grown, lumber and pulp production cannot be maintained on the present scale, and some economic adjustment in consumption of the two industries is imperative. Further, they emphasize the urgent necessity of reducing to the lowest possible minimum the losses annually suffered from fires, insects and decay. The situation in this province is veritably the occasion for the utmost concern: if impending decline in the forest industry is to be forestalled, it can only be by the application of serious measures aimed at the curtailment of wastage that now takes place, and in measures designed to increase the annual increment."

CHAPTER IV.—QUEBEC

In passing to a discussion of the pulpwood situation in the province of Quebec, we now have to consider a region where the land areas, and consequently timber resources, are on so much larger a scale that it has not been possible for the Commission, with the information at its disposal, to penetrate to the same degree of finesse some of the points discussed for Nova Scotia and New Brunswick. In the latter provinces, settlement and forest exploitation have for many years extended to almost all parts. In Quebec, and in the provinces farther west, there are still vast areas which may be designated as hinterland, about which the knowledge as to actual resources is at best imperfect.

SECTION 1.—TOTAL PULPWOOD RESOURCES

With a total land area of 690,865 square miles the forest embraces some 516,822 square miles, approximately 75 per cent. Of this forest area, slightly less than 40 per cent may be considered as merchantable, or liable to become so within a reasonable time.

On the entire forest area there is reputed to be a total stand of 345,150,000 cords of pulpwood of the five species, spruce, balsam, hemlock, jackpine and poplar. The amount of hemlock present is relatively small—less than 1 per cent—and it is, moreover, rather urgently in demand for dimension lumber; it may therefore reasonably be eliminated from serious consideration as pulpwood. While there is a larger amount of jackpine, approximating 5 per cent of the total stand above referred to, and while this species enters to a limited extent into the consumption of most pulp mills which are dependent upon areas where jackpine is a constituent of the stand, there are nevertheless other uses, such as railway ties, etc., to which the species is admirably adapted, and for which it is in great demand. Therefore, so far as the present stand of merchantable jackpine is concerned, it is not altogether probable that it will enter very strongly into pulpwood supplies. By reason of the development of extensive

young stands of this species, still far from maturity, it is, however, quite conceivable that it will ultimately become of much greater importance for pulp manufacture.

Although the total stand of poplar in the province is approximately 45 million cords, the extent to which this species has been used by local pulp industries is almost negligible. Future developments may bring about more extensive use within the province, but at the present time its importance as a pulpwood species is confined almost entirely to export.

Making reasonable allowances for jackpine and also to a certain extent for poplar, the total accessible and merchantable stand of pulpwood in the province is approximately 160 million cords. Of this amount spruce and balsam are available to the extent of about 131 million cords. This reduction is necessary by virtue of the fact that the figures for total pulpwood stand include vast areas of forest land sparsely timbered with small trees, in many cases of great age, growing under conditions of very inferior drainage, and for which there is little justification for the hope that they will become merchantable within any reasonable time.

SECTION 2.—PULPWOOD UNDER EXCLUSIVE CONTROL OF THE PROVINCE

As previously intimated, the province of Quebec embraces such a large area of forest land, some of it very rugged and inaccessible that exploitation has not penetrated the hinterland to nearly the same extent as has been the case in the maritime provinces. Moreover, the authorities of the province early recognized the desirability of retaining in the Crown title to forest lands. For these reasons, relatively a small portion of the forest area has been alienated in fee simple. However, there have been disposed of, under the license system, large areas of the more accessible blocks of timber.

Aside from all lands totally or partially alienated, the province still retains full title to both soil and timber on an area of 410,774 square miles, approximately 79.5 per cent of the forest. On this vast tract, the total stand of the five species is approximately 147 million cords. Without further explanation, however, the figure is liable to be misleading, for, to a greater extent the quantity is made up of timber very thinly scattered over exceedingly large areas which have no commercial value now, and which cannot be expected to attain merchantability for a great many years to come,—some of it, never. Somewhat less than about 30 million cords, may be considered to be of value at present or within reasonable time in the future.

Reference to Table I will indicate that even this total of 147 million cords on unalienated lands is less than the total stand on leased or licensed lands; moreover, so far as merchantability is concerned, the proportion is very much lower,—probably little more than one-quarter of the amount of timber in this category on the lands under Crown License. Even so, the 30 million cords of reasonably merchantable timber constitutes a reserve, and with the additional forest area unalienated in any form, leaves the province in an excellent position for the shaping of future forest policy,—any restrictions as to methods of operation or control of manufacture, which may appear to be desirable or necessary being thoroughly applicable to this portion of the forest resource.

SECTION 3.—PULPWOOD UNDER PARTIAL CONTROL OF THE PROVINCE

Crown lands under license, some 71,875 square miles, embrace 13.9 per cent of the forest area. It is these lands that contain the great bulk of the accessible and merchantable timber of the province. Through several generations timber has been disposed of on this basis, with the result that lumbermen

SESSIONAL PAPER No. 310

and pulp operators have taken advantage of the method to acquire vast areas of timber to provide for the requirements of their manufacturing industries. The total stand of the five species on these lands is estimated at 178 million cords. Eliminating those portions which have no present value and no visible future value, however, there is estimated to be about 100 million cords of pulpwood available, nearly 90 per cent of which is spruce and balsam.

Although the licenses under which this timber is held may be virtually perpetual, they are nevertheless subject to very definite control by the provincial authorities. Only upon compliance with regulations which may from time to time be established may the licenses be considered as permanent in character. From the viewpoint of the State, therefore, it is a fortunate circumstance that over the major portion of the merchantable timber stand, the province is strongly entrenched in a position which permits of developing the policy under which the forest estate is operated; making provision, as circumstances and economic conditions permit, for improved methods of utilization. Not only are methods of operation subject to control, but the province may and does apply the principle of home manufacture of the timber cut from licensed Crown lands.

SECTION 4—PULPWOOD ON PRIVATELY OWNED LANDS

Approximately 6.6 per cent (34,173 square miles) of the forest area has been alienated in fee simple. Of this, about one-third carries a stand of pulpwood timber estimated at approximately 20½ million cords, all of which may be considered as accessible and merchantable, as it is situated in the older, and consequently well settled, parts of the province. The timber included consists essentially in spruce and balsam with small proportions of other pulpwood species. It is this body of timber that is entirely divorced from provincial regulation or control, both from the standpoint of operating methods and requirements for domestic manufacture. From such lands, as well as from the small woodlots of settlers on agricultural lands, is drawn the large quantity of pulpwood annually exported to the United States. It is therefore evident that of the total merchantable pulpwood stand in the province, approximately 12.6 per cent is under present conditions exportable without manufacture.

SECTION 5—OWNERSHIP OF PRIVATE TIMBERLAND AND PULPWOOD

The alienated forest area of 34,173 square miles may be divided in three main classes,—firstly, the seigniories conceded mainly during the French regime, comprising an area of 16,686 square miles; secondly, settlement lands disposed of largely under aegis of the Church, embracing an area of 14,707 square miles; thirdly, an area of 2,780 square miles granted as subsidies to railways. In addition to the foregoing main methods of disposal, as a means of colonization the government has for many years followed the practice of issuing "location tickets" on timber bearing lands. The location ticket, granted by sale to the settler, imposes certain conditions and restrictions as to residence and clearings, the observance of which entitles him to letters patent.

Due to the absence of any consistent and well segregated records of ownership, either in the provincial or federal head offices, it is impossible to present a comprehensive discussion on the subject of ownership as between individuals and companies, or between Canadians and foreigners. However, the figures presented in the preceding paragraph in a measure indicate the various classes of private holdings. Further, it may be stated that, so far as is known, approximately 60 per cent of the privately owned timberlands is controlled by foreign capital. On the hypothesis that the timber, even though

varying greatly in density of stand from area to area, is nevertheless fairly consistent in acre averages as between the several classes that have been alienated, it would appear that about 12 million cords, with free right of export, are controlled by foreign capital, this amount constituting 7½ per cent of the total merchantable and accessible stand of the province.

SECTION 6—SUMMARY RE PROVINCIAL CONTROL OF MANUFACTURE

The foregoing discussion reveals the fact that, under ownership conditions which obtain in Quebec, governmental restrictions as to manufacture, calculated to prevent the export of raw wood, apply to over 87 per cent of the available supplies. Further, that so far as future disposal of forest lands which are at present unmerchantable is concerned, the present method of license, which reserves to the Crown the soil rights, ensures that the ratio of exportable wood to the total stand will increase. Owing to present rapid utilization and diminution in the amount of privately owned timber, it is reasonable to anticipate that the ratio will decrease.

SECTION 7—CONSUMPTION OF TIMBER IN QUEBEC

Table I gives the total stand of coniferous saw-timber in the province as closely approaching 41½ billion feet. Included in this are the following amounts of the species indicated:

	M.B.F.
Spruce..	15,000,000
Balsam..	10,000,000
White Pine..	7,500,000
Cedar..	5,000,000
Red pine..	1,800,000
Jackpine..	1,250,000
Hemlock..	800,000
Larch..	3,000
Total softwoods..	41,353,000

The hardwood stand of saw-timber size, consisting of birch, maple, poplar, beech and other species is estimated at about 12¾ billion feet, board measure.

Confining discussion to the essential pulpwood species, spruce and balsam, it is well to study the consumption under the various forms of utilization. The spruce and balsam saw-timber, converted to volume measurement represents approximately 50 million cords of wood. Aside from this amount, there is therefore available some 81 million cords of spruce and balsam which is suitable for the manufacture of pulp,—the aggregate available amount of the two species being 131 million cords (see Table I).

Table IV shows the amounts of the various species used in pulp manufacture over the decade 1913 to 1922. It is noticeable that spruce and balsam supplied nearly 98 per cent of all pulpwood used in that period. While jackpine has been used to the extent of less than 2 per cent, the amounts of hemlock and poplar used locally are to all practical purposes negligible. Comparing spruce and balsam, the former has supplied approximately 65.5 per cent, and the latter 32.2 per cent of all the pulpwood consumed. It is evident from the figures for individual years that there has not been any great variation in the proportions of spruce and balsam. The table clearly demonstrates, further that the heavier drain for pulpwood requirements falls upon spruce, furnishing as it does, nearly two-thirds of the supply.

SESSIONAL PAPER No. 310

TABLE IV—LOCAL CONSUMPTION OF WOODS FOR PULP MANUFACTURE—QUEBEC

Cords

Year	Spruce	Balsam	Jack-Pine	Hemlock	Poplar	Miscellaneous	Total
1913.....	389,523	222,738	13,327	705	3,641		629,934
1914.....	404,290	211,943	16,746	172	3,345		636,496
1915.....	455,165	213,376	25,953	286	3,182		697,962
1916.....	564,083	331,307	24,615	1,258	3,009		924,272
1917.....	849,004	255,695		1,581	3,589		1,109,869
1918.....	733,606	342,807		5,336	3,704	25	1,085,478
1919.....	760,586	410,389		2,146	2,894	119	1,176,134
1920.....	831,921	484,551	1,558	12,602	3,115	68	1,333,815
1921.....	715,432	363,405	26,975	3,630	1,760	75	1,111,277
1922.....	916,445	424,407	62,251	1,173	609	555	1,405,440
Total.....	6,620,055	3,260,618	171,425	28,889	28,848	842	10,110,677

TABLE IVa—SPRUCE AND BALSAM MANUFACTURED INTO LUMBER—M. BOARD FEET—QUEBEC

Year	Spruce	Balsam	Total
1913.....	412,259	20,746	433,005
1914.....	657,983	198,934	856,917
1915.....	599,811	170,794	770,605
1916.....	497,241	141,352	638,593
1917.....	548,159	30,097	578,256
1918.....	459,091	34,616	493,707
1919.....	484,075	42,442	526,517
1920.....	557,018	47,116	604,134
1921.....	384,220	26,764	420,984
1922.....	414,889	42,239	457,128
Total.....	5,014,746	765,100	5,779,846

NOTE:—Complete figures for lumber production of all species will be found in Table IVc.

Table IVa shows the consumption of spruce and balsam consumed in the manufacture of lumber. By converting to cordwood measure the amounts so used, and consolidating them with figures for pulp consumption, as shown in Table IV, the combined figures of Table IVb covering spruce and balsam consumption in the two industries are derived.

TABLE IVb—AMOUNT OF SPRUCE AND BALSAM CONSUMED IN MANUFACTURE OF LUMBER AND PULP—QUEBEC

Expressed in cords—500 B. ft.=1 cord

Year	Spruce	Balsam	Total
1913.....	1,214,041	264,230	1,478,271
1914.....	1,720,256	609,811	2,330,067
1915.....	1,654,787	554,964	2,209,751
1916.....	1,558,565	614,011	2,272,576
1917.....	1,945,322	315,889	2,261,211
1918.....	1,651,788	412,039	2,063,827
1919.....	1,728,736	495,273	2,224,009
1920.....	1,945,957	578,783	2,524,740
1921.....	1,483,872	436,933	1,920,805
1922.....	1,746,223	508,885	2,255,108
Total.....	16,649,547	4,790,818	21,440,365
Average.....	1,664,954	479,082	2,144,036

The average consumption of spruce and balsam for both lumber and pulp over the decade was 2,144,036 cords. It will be observed from Table IV that, with the exception of 1918 and 1921, there was in each year an increase in pulpwood consumed, over that of the previous year. Table IVb for combined consumption, on the other hand, does not denote nearly the same tendency toward continuous increases; in fact, the average of 2,144,036 cords appears to offer an excellent basis for consideration of the question. While the tendency to increase has been pronounced in pulpwood, the general tendency has been toward decrease in consumption of the species for lumber,—the latter offsetting the former, and thereby creating more or less constancy in combined consumption.

It is now necessary to discuss pulpwood exports, figures for which are given in Table IVc.

TABLE IVc—EXPORT OF PULPWOOD FROM QUEBEC

Cords

Year	Export
1913.....	882,260
1914.....	687,421
1915.....	624,269
1916.....	786,879
1917.....	698,839
1918.....	885,772
1919.....	661,414
1920.....	827,982
1921.....	601,846
1922.....	553,839
Total.....	7,210,521
Yearly average.....	721,052

It is of more than passing interest to note that the exports in 1923, official figures for which have been secured, totalled 760,328 cords. Although this indicates an increase of some 47,300 cords over the average for the decade, it is to be noted that in four previous years Quebec exports had been greater than they were in 1923,—the year of greatly increased exports for the whole Dominion. As a matter of fact, it would seem that, except for fluctuations due to conditions in the industry, there has been nothing approaching abnormality in Quebec pulpwood exports.

Although the figures in Table IVc permit us to gauge, approximately, the export trade in this commodity, they do not, as explained elsewhere, accurately represent the actual exports. Some wood comes in from the maritime provinces and from Ontario, and is cleared at Quebec ports, and thus credited to Quebec; on the other hand, a much larger quantity is cut in Quebec, and leaves Canada through Ontario and New Brunswick ports, particularly the former, and is thus not credited to Quebec, in which province it originates.

Complete figures covering this interprovincial traffic, as previously stated, are unavailable, but a period study made of transactions at ports of exit indicates that, on the one hand, Quebec exports were swelled to the extent of some 49,000 cords by wood coming from Ontario, New Brunswick and Nova Scotia. As against this, official export figures for the province are short by some 90,500 cords of pulpwood cut in that province, but exported through Ontario and New Brunswick ports. While there is no basis for the definite conclusion that pulpwood shipments by the various routes are constant from year to year, there is no reason to believe that they are not fairly so; we may, therefore, apply a net increase of 41,500 cords to the average of official yearly figures for Quebec

SESSIONAL PAPER No. 310

exports; in these premises, the average yearly exports from that province may be set at 762,500 cords.

Statistics as to quantities of the various species exported never having been collected, no authoritative figure can be given for the amount of poplar which finds its way across the border. From available information regarding poplar consumption in the United States, and imports of poplar to that country, and upon the basis of evidence received from persons interested in the export trade, it appears that about 60,000 cords of poplar is cut and exported from the province. Deducting this from the yearly average arrived at above, the total exports of spruce and balsam therefore approximate 702,500 cords.

Turning to the consumption of pulpwood species for other purposes, the census figures covering 1920 indicate that the farms of Quebec supplied the following products:—

Fuelwood.	3,303,436 cords
Fence posts.	4,064,675 pes.
Rails.	1,622,493 "
Railway ties.	532,713 "

In view of the presence of other species, better adapted to such purposes, the percentage of spruce and balsam consumed in these directions is relatively low. Appreciable amounts are so used, however, and it is conservatively estimated that about 50,000 cords of spruce is consumed in these directions. The mines of the province are not such as to entail the use of sufficient amounts to require consideration.

The average yearly production of lath in the province has been approximately 165 million, of which about 129 million are manufactured from spruce. The total amount of wood used in production of the latter is about 56,000 cords. In Quebec laths are primarily made from slabs and other waste resulting from larger operations. Nevertheless, a certain amount of small spruce timber is cut especially for this purpose, and the allowance of ten thousand cords for this appears reasonable.

Coming to a summation of figures for spruce and balsam consumption for lumber, pulp, and miscellaneous purposes, it is apparent that a total upwards of 2,900,000 cords has been annually so used. There is little doubt that if figures were available for still other uses, such as piling and round or hewn construction timbers, the total consumption would reach 3 million cords per year. As between these totals, the annual consumption of spruce alone must run between 2,200,000 and 2,300,000 cords, which amount is drawn from a total merchantable and accessible stand of approximately 90 million cords.

SECTION 8.—THE EXTENT OF PULP AND SAWMILL INDUSTRIES

Of Quebec it may truly be said that the development of the pulp and paper industry has been phenomenal. In a period of fifteen years there has been built up, from very humble beginnings, an industry which now involves an invested capital close upon two hundred millions of dollars. Quebec leads all other provinces in production of pulp, furnishing slightly more than one-half of the Dominion total. In the production of paper products she is a close second to Ontario,—supplying 43 per cent of all paper products manufactured in the Dominion. By reason of projects now under development, it is quite clear that the near future will witness considerable expansion of the industry.

So far as past development is concerned it is only necessary to review the figures presented in Table IVd, to appreciate to the full the remarkable development which has been experienced. There has been consistent growth in almost every phase of the industry. In the manufacture of groundwood,

14-15 GEORGE V, A. 1924

increases have been consistent except for fluctuations due to industrial conditions, the most serious disturbance in market conditions occurring in 1918. In production of chemical pulp, also, marked progress has been experienced. Finally, in the manufacture of newsprint the record is one of almost continuous progress.

TABLE IV_D—PULP AND PAPER INDUSTRY—QUEBEC

Year	Pulp Production						Total
	Ground-wood	Sulphite Bleached	Sulphite Un-bleached	Sulphate	Soda	Miscellaneous	
	Tons						
1913.....	398,664	52,825	60,238	2,572			514,299
1914.....	394,321	56,503	62,692	1,893			515,409
1915.....	425,626	50,612	82,405	3,150			561,793
1916.....	448,938	142,880	90,909	3,877			686,604
1917.....	519,891	148,859	111,924	3,576			784,250
1918.....	493,520	180,972	124,507	3,031			802,030
1919.....	515,457	40,215	145,279	3,395			831,291
1920.....	558,149	36,815	210,799	4,838	16,262		974,766
1921.....	482,176	63,051	121,992	3,479	3,236		784,906
1922.....	612,597	44,257	244,578	793	7,720		1,088,205
Totals.....	4,849,339	632,651 184,338	722,648	1,096,755	30,604	27,218	7,543,553

TABLE IV_D—PULP AND PAPER INDUSTRY—QUEBEC

Year	Paper Production					Total
	News-print	Book and Writing	Wrapping	Boards	Other Paper Products	
	Tons					
1913.....						
1914.....						
1915.....						
1916.....						
1917.....	297,623	14,696	36,870	34,852	7,089	391,130
1918.....	296,618	17,161	39,418	35,827	30,956	419,980
1919.....	316,409	19,295	40,098	45,323	35,098	456,223
1920.....	358,185	24,130	48,705	54,685	21,193	506,898
1921.....	323,254	15,428	33,475	27,166	13,745	413,068
1922.....	457,608	21,533	57,465	32,595	18,576	587,777
Totals.....	2,094,697	112,243	256,031	230,448	126,657	2,775,076

Turning, now, to lumber production, Table IV_E gives the amounts of lumber manufactured from the various species. With relatively low production in 1913 (the previous year, 1912, had also been one of low production) there was a sharp increase in 1914, the latter year giving the peak for lumber production of all species in the decade. It was, moreover, the peak year of spruce lumber production, and, with the exception of hemlock, the peak year in lumber production from all species of pulpwood value. There was a slight falling off in 1914, a much larger decrease (about 24 per cent) in 1915, followed by small yearly increases between 1916 and 1920. Even in 1920, the production was still about 19 per cent below that of the peak year 1914, and 15 per cent below 1915, subsequent to which year the serious reduction in production had occurred. The years 1921 and 1922 witnessed a still further reduction,—in fact, production was far below average, and was but little greater than in the low year, 1913.

SESSIONAL PAPER No. 310

TABLE IV—QUEBEC LUMBER PRODUCTION, 1913 TO 1922 INCLUSIVE BY KINDS OF WOOD, QUANTITY CUT AND VALUE

Kinds of Wood	1913		1914		1915		1916		1917	
	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value
		\$		\$		\$		\$		\$
Spruce.....	412,259	6,498,301	657,983	9,646,031	599,811	9,243,084	497,241	8,075,194	548,159	10,528,751
White Pine.....	72,140	1,649,202	118,231	2,641,281	157,256	3,566,557	60,439	1,428,174	108,306	2,559,872
Hemlock.....	38,491	543,514	31,323	438,522	38,064	529,473	35,944	541,676	45,381	917,169
Birch.....	34,124	645,204	27,986	427,906	44,980	799,113	43,191	810,822	26,839	721,209
Balsam Fir.....	20,746	304,920	198,934	2,850,724	170,794	2,445,769	141,352	2,106,145	30,097	551,541
Basswood.....	13,121	271,077	14,221	248,868	11,890	241,951	9,725	188,762	4,453	111,544
Red Pine.....	9,750	197,271	20,920	435,764	17,895	306,907	4,590	85,282	3,422	87,704
Maple.....	7,364	129,049	8,391	135,682	6,405	115,476	3,961	77,715	7,389	182,316
Cedar.....	6,727	105,433	8,273	115,822	4,493	73,363	4,014	71,891	11,549	219,135
Ash.....	4,756	89,603	3,965	73,353	6,156	108,095	4,235	77,966	3,444	79,426
Elm.....	3,449	59,636	3,016	49,251	3,490	57,064	2,190	38,551	2,179	47,129
Poplar (Aspen).....	1,709	26,417	2,395	29,230	907	12,638	826	12,621	47	47,492
Beech.....	1,596	26,364					69	1,242	1,194	22,528
Tamarack.....	1,472	22,734	4,287	70,007	2,791	47,476	112	1,945	3,733	70,968
Jack Pine.....	1,160	18,561	13,727	192,178	12,006	197,852	9,622	182,818	2,849	58,892
Oak.....	611	15,819	1,462	40,205	459	12,777	565	13,304	173	7,585
Butternut.....	326	6,966	795	16,695	246	9,480	76	2,470	109	2,393
Poplar (Cottonw'd).....	238	3,465							21	335
Poplar Balsam.....	200	2,290					397	5,955	462	7,072
Cherry.....	70	1,536	273	7,371	58	1,731	74	2,350	31	2,177
Hickory.....	22	466							115	4,610
Chestnut.....	10	300							36	1,278
Walnut.....	5	400							41	3,330
Poplar.....			2,116	26,090	1,086	15,609				
Other Kinds.....									9,266	192,924
Custom Sawing.....									15,545	291,446
Totals.....	630,346	10,618,528	1,118,298	17,444,980	1,078,787	17,784,415	818,523	13,722,883	827,574	16,718,726

Kinds of Wood	1918		1919		1920		1921		1922	
	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value
		\$		\$		\$		\$		\$
Spruce.....	459,091	10,896,168	484,075	16,921,079	557,018	21,757,658	384,220	11,262,555	414,889	10,564,141
White Pine.....	137,282	4,002,780	79,550	3,319,183	61,792	2,891,786	42,802	1,628,122	60,615	2,186,988
Hemlock.....	51,820	1,198,754	54,779	1,665,626	72,418	2,714,857	57,295	1,562,226	42,131	973,407
Birch.....	39,833	1,170,442	40,944	1,582,050	55,398	2,619,241	56,179	1,915,032	39,850	1,347,298
Balsam Fir.....	34,616	771,100	42,442	1,240,198	47,116	1,869,740	36,764	949,236	42,239	993,542
Basswood.....	9,542	290,025	13,299	495,365	15,277	679,589	13,316	456,834	8,126	256,183
Red Pine.....	10,514	325,430	7,528	289,297	9,549	376,076	4,087	134,894	3,746	105,660
Maple.....	18,889	537,391	10,618	395,867	15,165	755,734	14,177	531,980	8,860	300,322
Cedar.....	19,227	419,477	9,461	295,552	23,199	894,756	8,868	255,646	8,710	224,301
Ash.....	6,084	142,628	4,545	160,687	6,258	369,664	5,510	203,359	3,806	117,953
Elm.....	5,204	141,986	4,112	131,521	5,667	235,178	6,130	193,302	2,575	71,975
Poplar (Aspen).....	1,836	39,413	6,181	211,254						
Beech.....	1,126	29,398	3,231	102,705	2,157	89,852	3,254	97,685	1,545	45,842
Tamarack.....	4,002	101,904	2,153	67,491	2,719	106,298	822	19,486	871	22,041
Jack Pine.....	2,272	61,712	3,479	102,805	15,679	723,025	11,284	306,700	7,355	180,618
Oak.....	310	10,813	1,462	48,802	960	50,484	695	35,311	547	21,588
Butternut.....	238	9,277	317	11,368	422	16,643	263	10,344	224	7,838
Poplar (Cottonwood).....	33	665								
Poplar Balsam.....	443	12,413	170	4,682						
Cherry.....	210	4,892	133	4,255	828	33,575	112	3,891	108	3,654
Hickory.....	72	2,725	30	915	10	490	42	1,920	24	855
Chestnut.....										
Walnut.....	4	140	22	685	45	1,480	8	350	57	2,650
Poplar.....					4,219	161,789	2,644	64,388	1,365	30,430
Other Kinds.....	9,516	202,483	3,758	93,938	20,536	880,286	1,047	23,221	1,711	31,740
Custom Sawing.....	28,920	544,588	112,323	3,050,321						
Totals.....	841,084	20,916,604	884,612	30,195,646	916,422	37,128,201	649,334	19,656,462	619,351	17,489,026

14-15 GEORGE V, A. 1924

In the individual years of the decade spruce production has fluctuated, in percentage of total cut, from 55 per cent to 66 per cent of the total, and over the entire decade it has furnished material for very nearly 60 per cent of total production. Whereas white pine at one time constituted a very material part of the saw-timber cut in Quebec, it has, due to the waning of supplies, fallen off very seriously; in only one year of the decade did production of this species reach 15 per cent of the total; more frequently, it has varied between 5 per cent and 10 per cent of the total.

It is at once evident from the foregoing discussion that the great drain for both lumber and pulp production falls upon spruce.

SECTION 9—TREND OF THE PULPWOOD BUSINESS IN QUEBEC.

It has previously been demonstrated that 1923 export figures do not exhibit any startling increase over the average exports for the decade, being only approximately $5\frac{1}{2}$ per cent greater. It was also pointed out that in four previous years the total exports had been greater than those of 1923. It is interesting to note, however, that as compared to 1922, in which year the exports were low, the 1923 figure shows an increase over the previous year of a little more than 37 per cent,—synchronizing closely with the annual increase for the Dominion exports of approximately 38 per cent. The more significant comparison, however, is undoubtedly that made to the figure for average exports for the decade. With these facts in view, it is clear that the great increase in the total use of pulpwood over the decade was occasioned by increased production by the pulp industry within the province. By reason of new pulp projects at present under development, it is safe to assume that the next few years may witness still greater local consumption of pulpwood,—to the extent possibly of several hundred thousand cords. Even if there be no further gain in exports, therefore, we may definitely anticipate a considerable enlargement upon the amounts of pulpwood cut from the forests of Quebec.

In 1920, the year covered by the Census, pulp manufacturers in Quebec cut from their own limits 1,062,387 cords of pulpwood, as against 271,428 cords purchased from outsiders. In the same year the farmers and settlers of the province produced 695,481 cords. Assuming, for the moment, that all wood purchased by the mills originated from farmers and settlers, it appears that some 424,053 cords would have been available for export, and under these circumstances the percentage of farmers' wood to total exports would be approximately 51 per cent. This, obviously, would represent the lowest possible minimum of farmers' wood exported. Going to the other extreme, and assuming that all of the farmers' wood was exported, it is clear that the latter would have constituted slightly less than 84 per cent of total exports. This manifestly disposes of some extravagant claims which have at times been made "that 90 per cent, or even 95 per cent, of the exported wood comes from the farms." Furthermore, it is known that many mills purchase wood from farmers and settlers; it is also known that many operators, other than farmers, enter very materially into the export trade; both of these facts indicate clearly that the percentage of farmers' wood in total exports is much lower than has frequently been stated. In the absence of concrete data, it is estimated that about seventy-five per cent at least of the wood purchased by mills comes from the farmers, and under these circumstances, the amount of wood cut by the latter, and available for export, would be some 492,000 cords,—about 60 per cent of total exports.

Although under ordinary circumstances accurate conclusions ought not to be drawn from calculations based upon figures for the one year, it may be pointed out that, whereas the 1920 figures indicate that the mills purchased

SESSIONAL PAPER No. 310.

about 23 per cent of their wood, the average purchases for the six year period 1917 to 1922 represent $25\frac{1}{2}$ per cent of total consumption. A certain degree of constancy in percentage amounts purchased by the mills, coupled with a somewhat similar condition in exports, in a measure justifies tentative conclusion as to the extent to which farmers' wood enters into exports.

In the foregoing discussion it is made evident that within the province there has been a limited market for pulpwood from farm lands. It is equally clear, however, that the pulp manufacturers in this province have not so far taken advantage of the opportunity to purchase wood from this source to the same extent as has been done in some other provinces.

The situation as regards pulpwood supplies of and consumption from private lands is one which should be the cause of some concern at least to the owners thereof. With a total supply of about $20\frac{1}{4}$ million cords, this timber is being removed at the rate of about 1,070,000 cords per year. Although this consumption does not directly affect Crown lands, licensed or unlicensed, for the privately owned timber lands it is a degree of utilization which simply cannot be sustained for any great length of time.

Review of the statistics also makes clear that with development of the pulp industry there has been a marked falling-off in the lumber industry. Although, as fully explained in Chapter I, the profitable pulpwood forest is one containing trees of sizes larger than those conceived by the man on the street, it is nevertheless the case that the pulp operator can make use of smaller material than can the saw-mill operator. With the reduction in size of accessible timber, therefore, brought about as a result of generations of saw-log exploitation, many timber areas have become of relatively greater value to the pulp operator than they can be to the saw-mill man. In this province also, it appears to be true that with continuous and rapid development in pulp manufacture, the supplies available cannot be expected to sustain a saw-mill industry of the same proportion as that which existed a few years back.

SECTION 10—SUMMARY OF SITUATION—DURATION OF SUPPLIES

As a preliminary to further discussion, and working upon the 'ultimate exhaustion' basis*, it may be observed that with a total available spruce-balsam stand of 131 million cords, and a total annual consumption of these woods approximately 3 million cords, the supplies might be expected to fill requirements of present proportions for a period of 43 or 44 years. Such a result is, however, based on the assumption that balsam would be used for lumber as well as for pulp. Taking available spruce supplies amounting to about 90 million cords, offsetting which there is an annual consumption of 2.3 million cords,—the supply would suffice for about 39 years.

The difficulty of establishing a precise relation between annual growth in the forest and annual wastage due to the various agents of depletion, has been fully explained in dealing with Nova Scotia and New Brunswick, in Chapters II and III; of Quebec it may be said that by reason of the more northerly situation of a greater part of the province, and comparative remoteness from the humid conditions which obtain in more maritime districts, the conditions for actual regeneration of trees in the province generally are not so favourable as in Nova Scotia and New Brunswick. Whether or not the same position should be taken regarding the annual growth, after germination is secured, is open to question. Certainly, however, there is no ground for the belief that the rate of increment generally in Quebec is greater than it is in the Maritime Provinces. Accordingly, adopting the rate of 1 per cent, and applying this to the entire spruce-balsam stand of 279 million cords (altogether generous treatment, it is

* See also, Section 10, Chapter II.

true, when the inaccessibility of, and very poor growing conditions on such large areas are considered) the total increment derived would be 2.79 million cords.

While annual consumption exceeds the figure thus arrived at for increment, it is close enough, perhaps, to permit of the general observation that total increment and actual consumption may be fairly close to each other; upon this premise, it is at once apparent that all losses from fire, insects, and decay represent a net depletion in the stand.

During the past five years the average area fire loss has been approximately one million acres per year; of this, about 270,000 acres consisted of merchantable timber; 115,000 acres of young growth; 260,000 acres of cutover lands; and the balance, previous burn and barren. A most conservative estimate of average timber loss is 2 million cords per year, of which probably $1\frac{1}{2}$ million cords per year at least would be in the pulpwood species, only a small percentage of which is susceptible to salvage. On the other hand the losses through budworm attacks have been variously estimated from 100 to 150 million cords over the period of about 10 years through which the insect has operated; taking the lower figure, the budworm has caused annual depletion at the rate of 10 million cords, part of which has already been salvaged. Losses through other insects and through fungi, it is impossible to determine, but there is every evidence that they are considerable. Although the budworm is apparently still operating in some parts of the province, the epidemic stage is past, and unless the province is visited with other infestations of similar character this average annual depletion amounting to at least $11\frac{1}{2}$ million cords, for fire and budworm, will not be continued,—there would be little hope for the province if it were.

Obviously, however, there is every reason for the conclusion that unless the fire situation is to be in large measure controlled—and the building up of an organization for that purpose will be the work of many years—the annual loss from this and other pests will continue to exceed the amount of the annual cut; it will also exceed the amount of the annual increment presumed above. Putting it another way, these losses may be expected to more than counteract annual growth in the forest; therefore, the annual cut at present taking place manifestly constitutes only part of the actual net depletion in the wood capital of the forest. If the annual cut be increased (there is every reason to anticipate that it may, as a result of increasing mill capacity) the wood will disappear that much more rapidly. Finally, that amount by which fire and similar losses exceed the amount of annual increment, added to the total cut, together represent the actual net depletion in the forest.

Here again, it is abundantly clear that figures derived by mathematical division of annual consumption into total supplies are entirely misleading, and err on the side of optimism to an extent which can in no sense be justified. If a smaller rate of increment be used—and there is considerable argument for doing so—the situation is that much worse.

Obviously, if there is at present any approach to equality between the annual increment and consumption, the problem which faces the province of Quebec is that of preventing increased cut, and of bending all efforts towards drastic curtailment of fire and insect wastage. If these ends be attained there is some hope at least of establishing a balance between net annual growth and annual consumption. It need hardly be stated that the longer vigorous measures in this direction are delayed, the greater will be the reduction in wood capital, and the more hopeless will become the task of establishing a direct balance between growth and use.

CHAPTER V.—ONTARIO

In Ontario, also, as distinct from conditions of accessibility found in the Maritime Provinces, a large part of the forest area is so far removed from present or anticipated methods of transportation that many areas must be eliminated from practical consideration in an estimate of supplies available for a considerable period of time.

SECTION 1—TOTAL PULPWOOD RESOURCES

The total land area of the province is 365,880 square miles, embracing a forest area of 240,000 square miles, or approximately 65.6 per cent. Of the latter some 75,000 square miles, or 31 per cent, is considered to be merchantable and accessible, carrying timber susceptible of exploitation at present or within a reasonable time in the future.

On the entire forest area there is reputed to be a total stand of 207,850,000 cords of the five species, spruce, balsam, hemlock, jackpine and poplar, which if so used, and altogether aside from accessibility, would be available as pulpwood. The proportion of hemlock is small, less than 2 per cent, and it has never been used locally to any appreciable extent in pulp manufacture. Furthermore, by reason of diminution in the stand of available saw-timber, the hemlock is more or less urgently required to fill the requirements for the manufacture of rough dimension lumber, for which purpose it has for many years been extensively used. Jackpine, on the other hand, constitutes between 17 and 18 per cent of the total stand, the species having taken possession of extensive areas of fire-swept land, particularly in northerly districts. There is little doubt that when the extensive young stands of this species develop to maturity, it will prove one of the most valuable woods in Ontario, largely by reason of its prevalence. Even now it is one of the important trees of the province. The present merchantable stand is urgently in demand for uses such as railway ties, and to a very limited extent it is used in the manufacture of pulp.

The stand of poplar in Ontario approximates 39½ million cords, but the extent to which it has been used in pulp manufacture in Canada is, to all practical purposes, negligible. While future developments may increase its use in this direction, its importance as a pulpwood species at the present time is confined entirely to export.

Making liberal allowance for jackpine and also for poplar (on the assumption that these species may attain greater importance in pulp manufacture) the total merchantable and reasonably accessible stand of pulpwood in the province is about 128 million cords. Of this amount, spruce and balsam, the main species now used, are available to the extent of 84½ million cords. The large reduction which has been made from the total stand for the entire forest area results, as previously implied, from the fact that considerable areas of the north country, as well as more limited stretches to the south, are so sparsely timbered with stunted old growth, that there is no justification for anticipating that they will attain merchantability within such limits of time as would permit of their serious consideration even as potential supplies.

SECTION 2.—PULPWOOD UNDER EXCLUSIVE CONTROL OF THE PROVINCE

Although very serious inroads have been made on the merchantable timber stand of older Ontario, and, in more recent years, large areas of pulp timber in the north country have been disposed of, there still remains, exclusively in the Crown, a very large part of the total forest area, some of it carrying timber susceptible of exploitation. The total area of forest unalienated in any form

whatsoever is 183,428 square miles, 76.4 per cent of the whole. This very large area carries a stand of the five pulpwood species estimated at approximately 119 million cords. As in the case of analogous figures for Quebec, however, qualifications are necessary in order to avoid misconception. Of the foregoing amount, about 46.6 million may be considered as the accessible and merchantable stand of the five species, of which some 30.3 million cords is spruce and balsam. On comparison with Quebec figures it will be seen that although total figures for unalienated timber in Ontario are not so high, the proportion which is accessible is greater. This arises from the fact that a much larger part of the province of Quebec is very inaccessible, and, also, the area of sparsely timbered country is much greater.

It may be pointed out that, in dealing with unalienated Crown lands, the broadest permissible interpretation is placed on the terms "merchantable" and "accessible"; it must by no means be inferred that the larger parts of such areas are immediately so; rather, the aim has been to make allowance for areas which will probably come under exploitation when the present more accessible stands are depleted. In Ontario, although the great bulk of the presently merchantable timber has been disposed of under license, the province nevertheless retains unimpaired control of a large proportion of the forest area, and holds a reserve of timber, which although perhaps of little immediate consequence, may later enter materially into the provision of pulpwood supplies, provided such resources are properly husbanded and protected.

SECTION 3—PULPWOOD UNDER PARTIAL CONTROL OF THE PROVINCE

Altogether an area of 48,600 square miles, embracing $20\frac{1}{4}$ per cent of the entire forest area, has been disposed of under the license system for lumbering and pulpwood operations. As previously intimated, it is this area that constitutes the immediately merchantable stand of timber, and from it the greater part of timber supplies for industries of the day are being drawn. On such lands the total pulpwood stand of the five species is a little better than 75 million cords. Eliminating stands of little present or anticipated value, there is estimated to be some 67.6 million cords of merchantable pulpwood; and of the latter, some 45 million cords is of spruce and balsam.

Insofar as manufacturing requirements are concerned, the conditions under which this timber is held are similar to those obtaining in Quebec; that is, it is required of operators that pulpwood shall be manufactured into pulp in Canada. In this manner, it will be seen, the province is in a position to fully control exports. Moreover, the licenses are subjected to changes in regulations which may from time to time be promulgated, and herein the province has the opportunity to exercise measures of control over operations, and to apply, as economic conditions permit, the restrictions and methods demanded by rational forestry practice.

SECTION 4—PULPWOOD ON PRIVATELY OWNED LANDS

An area of 7,972 square miles, about 3.4 per cent of the total forest area, has been alienated in fee simple. This consists essentially in railway subsidies, grants to settlement companies in the early days, and scrip lands disposed of to veterans. It is considered probable that the actual area of alienated timber land exceeds this amount, but these figures include all for which information is available in the provincial records. The total stand of pulpwood is approximately $13\frac{3}{4}$ million cords, all of which may be considered as accessible. Of this a little better than 9 million cords consists of spruce and balsam.

SESSIONAL PAPER No. 310

As to various classes of ownership,—5,390 square miles have been granted to railways, 630 square miles to settlement companies, and the balance, 1,952 square miles, as scrip to veterans. Records as to the extent to which these private timberlands are held by foreign capital were not available; from the nature of the grants, however, it is not probable that any large percentage is so held.

Insofar as timber on these private lands is concerned, the owners enjoy free right of export, and it is from such lands, as well as from areas under settlement, that the pulpwood exported from Ontario originates.

SECTION 5—SUMMARY RE PROVINCIAL CONTROL OF EXPORTS

It is apparent from the foregoing that, under conditions of tenure of timberlands in Ontario, the manufacturing restrictions at present in effect for all timber on Crown lands, whether licensed or not, preclude export of unmanufactured timber to the extent of almost 90 per cent of available supplies. The only exception to this general condition is in the case of poplar, and, on occasion, fire-killed timber. For the latter classes of material the province has permitted a certain amount of exports. Until recently, the exportation of unmanufactured hardwoods was also permitted, but the legislature recently placed an embargo on the export of all of the valuable hardwoods. So far as spruce and balsam are concerned, also, over 89 per cent of the available supplies are subject to local manufacturing restrictions, and hence are not permitted to be exported in a raw state. It also appears evident, that with the low percentage of privately owned timberland in the province, the ratio of exportable wood to the total stand is, under the present degree of use, liable to decrease rather than increase; particularly is this the case if unalienated lands at present unmerchantable are considered.

SECTION 6—CONSUMPTION OF TIMBER IN ONTARIO

Review of figures in Table I indicates that the stand of coniferous saw-timber in Ontario is 15,112 million feet, board measure. Included in this figure are the following amounts of the species indicated:—

	Ft. B.M.
Spruce..	4,000,000,000
Jackpine..	1,500,000,000
Hemlock..	1,250,000,000
Balsam..	200,000,000
	<hr/>
	6,950,000,000

The balance, 8,162 million feet, consists essentially in white and red pine, with relatively very small amounts of other softwoods. The hardwood stand, consisting of birch, maple, beech, poplar, and less important species, is estimated at 7,735 million feet.

Limiting discussion to the essential pulpwood species, spruce and balsam, a review of consumption will now be undertaken. First of all, the amounts of spruce and balsam, listed above, converted to cordwood measurement represent 8.4 million cords. Aside from this amount, therefore, there is 76.1 million cords of spruce and balsam less than 12 inches on the stump, and suitable for pulp manufacture. These two amounts together represent the total available spruce-balsam stand of 84.5 million cords (see Table I).

Table V shows the consumption of the various species in pulp manufacture during the decade 1913-1922. It is at once observed that over the whole period

14-15 GEORGE V, A. 1924

spruce and balsam supplied nearly 97 per cent of the total wood consumption of the industry. Jackpine was used to the extent of less than 2 per cent; hemlock slightly more than 1 per cent, while the consumption of poplar was negligible in amount. Comparing spruce and balsam, the former has supplied 88.8 per cent of the total; the latter 7.9 per cent. There seems to have been no regularity in variation as to percentages of balsam between the individual years of the decade. Comparing the consumption of these two species to that in Quebec, it is noticeable that in Ontario the proportion of balsam used is very much less than in Quebec,—this undoubtedly being due to the fact that balsam is not so prevalent in the Ontario pulpwood forest. Undoubtedly, however, the outstanding feature of the table is the fact that, throughout this period, and for the decade as a whole, spruce supplied in very great measure the requirements of the pulp mills of the province.

TABLE V.—LOCAL CONSUMPTION OF WOODS FOR PULP MANUFACTURE—
ONTARIO

CORDS

Year	Spruce	Balsam	Jack pine	Hemlock	Poplar	Total
1913.....	259,999	54,165	6,056	524	500	321,244
1914.....	358,988	75,218	7,969	5,076	500	447,751
1915.....	396,115	66,631	16,000	1,820	61	480,627
1916.....	528,165	77,121	15,102	15,520	1,704	637,612
1917.....	659,276	35,927	2,850	36,436	1,206	735,695
1918.....	711,574	41,803	25,851	1,759	3,704	784,691
1919.....	779,442	39,227	15,402	2,958	3,827	840,856
1920.....	887,519	34,998	14,185	3,914	2,056	942,672
1921.....	624,011	56,384	13,431	5,330	1,433	700,589
1922.....	897,988	64,150	17,210	1,287	.....	980,635
Total.....	6,103,077	545,624	134,056	74,624	14,991	6,872,372

TABLE Va.—SPRUCE AND BALSAM MANUFACTURED INTO LUMBER—
M BOARD FEET—ONTARIO

Year	Spruce	Balsam	Total
1913.....	104,485	4,364	108,849
1914.....	85,738	10,878	96,616
1915.....	84,095	4,341	88,436
1916.....	65,484	1,256	66,740
1917.....	49,477	2,271	51,748
1918.....	64,127	2,061	66,188
1919.....	180,487	1,439	181,926
1920.....	108,766	7,102	115,868
1921.....	44,565	1,355	45,920
1922.....	61,205	2,129	63,334
Total.....	848,429	37,196	885,625

NOTE.—Complete figures for lumber production of all species will be found in Table Ve.

In Table Va are included the figures for consumption of spruce and balsam in the manufacture of lumber. Converting the amounts consumed to cordwood measure, and consolidating the figures so derived with those of Table V, consumption in pulp manufacture, Table Vb is obtained, containing the figures for total consumption of the species in both industries.

SESSIONAL PAPER No. 310

TABLE Vb.—AMOUNT OF SPRUCE AND BALSAM CONSUMED IN MANUFACTURE OF LUMBER AND PULP—ONTARIO

Expressed in Cords—500 Bd. Ft. = 1 Cord.

Year	Spruce	Balsam	Total
1913.....	468,969	62,893	531,862
1914.....	530,464	96,974	627,438
1915.....	564,305	75,313	639,618
1916.....	659,133	79,633	738,766
1917.....	758,230	40,469	798,699
1918.....	839,828	45,925	885,753
1919.....	1,140,416	42,105	1,182,521
1920.....	1,105,051	49,202	1,154,253
1921.....	713,141	59,094	772,235
1922.....	1,020,398	68,408	1,088,806
Total.....	7,799,935	620,016	8,419,951
Average.....	779,993	62,002	841,995

For both lumber and pulp, the average yearly consumption of spruce and balsam was 841,995 cords. Reference to Table V shows that with the exception of 1921, in which year pulp production fell off, there was a continuous increase in amounts of wood consumed. The figures for lumber production in Table Va, however, show absolutely no inclination to continuity in variation; in part this is due to the fact that in Ontario, spruce is not the most important lumber species. The combination Table Vb, however, does exhibit more or less constancy in the variations. From this fact, as well as from consideration of the figures, it is quite evident that in Ontario the main use for spruce supplies has been in the manufacture of pulp. Also, if the year 1921 be overlooked, it is clearly the case that, in the later years of the decade, spruce and balsam consumption had almost doubled that of the first year. In other provinces, notably New Brunswick and Quebec, increase in pulpwood consumption was to a great extent compensated by decrease in lumber manufacture, and in those circumstances the yearly average derived for the decade was a safe one to use in gauging present consumption. Such is not the case in Ontario, however, for it cannot be expected that with continuous development in pulp output, there will be compensating reduction in lumber production. The average for the last five years of the decade is approximately 1,017,000 cords; the average for the last 4 years, about 1,050,000 cords; and the average of 1919, 1920 and 1922 is approximately 1,142,000 cords. Now, the relatively low figure of 1918 was, nevertheless, a considerable increase over 1917, and there was therefore no curtailment; in fact the figure for that year merely represented a step upward in rapidly increasing consumption. The low figure of 1921, however, was due entirely to curtailment. While there would perhaps be justification for taking the average for the three years 1919, 1920 and 1922, as a basis for gauging consumption from now on, it is thought advisable to include 1921, as a year of sub-normal production, and to accept, as a basis of further calculations, the approximate average for the last four years, namely—1,050,000 cords.

Coming to the question of pulpwood exports, Table Vc gives the official figures for the decade, these being based on authentic returns from collectors of customs at the various ports of exit.

It may here be observed that in 1923 the Ontario exports reached the unprecedented figure of 414,218 cords. Neglecting the 1923 figures, for the time being, however, a study of the figures in the table indicates that, in contradistinction to both Quebec and New Brunswick, there has been a very decided, and almost continuous, upward trend in the amounts of Ontario exports. Here

14-15 GEORGE V, A. 1924

TABLE Vc.—EXPORTS OF PULPWOOD FROM ONTARIO

CORDS

Year	Exports	Year	Exports
1913.....	84,699	1920.....	202,171
1914.....	139,743	1921.....	239,264
1915.....	202,239	1922.....	269,419
1916.....	149,745		
1917.....	161,652	Total.....	1,844,394
1918.....	199,421		
1919.....	196,041	Yearly average.....	184,439

again, therefore, it cannot be considered satisfactory to take the yearly average for the decade as a basis for estimating present or future consumption. With the exception of the year 1915, when exports were comparable to those of more recent years, there is a distinct "break" in the export figures between 1917 and 1918; in the latter year exports approached the 200,000 cord mark, and have nearly maintained or else exceeded that figure ever since. Therefore, taking the five years 1918 to 1922, the average annual export may be set at 221,263 cords. Referring again to 1923 exports, it will be seen that the average from and including 1918, a six-year period of high exports, would be upwards of 250,000 cords.

Before proceeding with discussion of consumption, however, it is advisable once more to refer to the question of interprovincial traffic in pulpwood. As stated in discussion of the export situation in Quebec, Ontario exports are swelled by an amount of some 41,500 cords of wood, cut in Quebec, but leaving Canada through Ontario ports. A similar situation exists in the west, in the province of Manitoba, a considerable amount of pulpwood is cut and exported through Fort Francis, an Ontario port of exit. In the year studied, some 27,500 cords of wood were handled in this manner, and apparently the trend is toward increase. On this basis, it appears that, in order to arrive at a true figure for Ontario exports, the customs figures must be reduced by some 70,000 cords. Depending upon the average selected, therefore (as between the five and six year figure) the average exports from Ontario may be said to have varied from about 150,000 to 180,000 cords per year. While there is perhaps no reason to expect that the abnormal figures of 1923 will be maintained, it does seem reasonable to assume that, contingent upon continuance of the present condition, permitting export, we might expect continued high exports. It is therefore quite reasonable to take the higher of the two averages, namely, 180,000 cords, as a basis for further discussion.

It is worthy of mention that the abnormal increase of exports experienced in 1923, for Ontario, accounts in great measure for the startling increase of 38 per cent in total Dominion exports.

Lacking official data in the customs reports as to the respective amounts of the various species exported, it is not possible to give accurate figures for this phase of the situation. By studying the import and consumption figures of the United States, however, and applying the process of elimination, it is possible to arrive at figures which indicate reasonably well the exports of the main species. United States consumption of imported poplar over the four-year period 1919 to 1922 averaged 160,000 cords per year, practically all of which was used in the States of Maine, New York, and Pennsylvania. Of poplar, it has already been explained, Quebec and New Brunswick have supplied 60,000 and 35,000 cords, respectively; it is undoubtedly the case, therefore, that most, if not all, of the balance, 65,000 cords, was supplied from Ontario. It must be clearly borne in mind that these figures do not include the amounts for the year

1923. During the latter year, Quebec and New Brunswick have undoubtedly maintained, if not increased, the export quota ascribed to them; also, Nova Scotia has "come in" with a small amount.

Setting aside the 1923 figures which clearly were far from normal, it is quite evident that the average annual exports of poplar from Ontario approximated 65,000 cords. The balance of exports manifestly is of spruce and balsam, perhaps in the ratio of about ten to one. The net average annual exports of these two species, therefore, may be taken at 115,000 cords. Of all the exports, spruce has averaged $57\frac{1}{2}$ per cent (probably more, as it is doubtful whether balsam attains the one-to-ten ratio); poplar, approximately 36 per cent; and balsam about $6\frac{1}{2}$ per cent.

Fuelwood	2,855,675	cords
Fence posts	1,106,086	pes.
Rails	372,375	pes.
Railway ties	635,610	pes.

Summing the various items of spruce and balsam consumption it appears that, for the manufacture of pulp and lumber; for exports, and for miscellaneous other purposes, the average consumption of the two species may be set at some 1,200,000 cords, of which spruce furnished approximately 1,116,000 cords, or 93 per cent. This average amount, and any increase which may arise through development in the pulp industry, must be drawn from a total of available spruce stand approximating 75 million cords.

In order to avoid premature conclusions as to the extent to which the available quantity of spruce will supply future demands, it will be necessary to review possible developments in the pulp and lumber industries. As pointed out, in Ontario, spruce has not so far attained such prominence in lumber production as has been the case in all other eastern provinces and also on the prairies. Pine has headed the list of lumber species in Ontario, but as will be pointed out later, the waning in supplies of this species may give rise to conditions where (if the lumbering industry is to be sustained on any basis comparable to that of the present) it will probably be necessary to add very materially to the annual cut of spruce.

SECTION 7—THE EXTENT OF PULP AND SAW-MILL INDUSTRIES.

In Ontario also, development of the pulp industry has been phenomenal. Fifteen years have witnessed almost constant increase in production. In 1922 the pulp production for this province alone exceeded the total production of the entire Dominion in the year 1912. Capital invested in the industry now reaches close to 150 million dollars. Although second to Quebec in quantity of pulp manufactured, Ontario leads all provinces in the production of paper products, with 47.4 per cent of the Dominion total to her credit.

TABLE Vd—PULP AND PAPER INDUSTRY—ONTARIO

Year	Pulp Production						
	Ground-wood	Sulphite Bleached	Sulphite Un-bleached	Sulphate	Soda	Miscellaneous	Total
				Tons			
1913.....	135,753	87,699		5,046			228,498
1914.....	202,715	115,877		6,641			325,233
1915.....	247,825	106,401		10,000			364,226
1916.....	308,416	154,530		10,068			473,014
1917.....	310,620	165,173		12,981	560	154	489,488
1918.....	277,922	216,255		10,459	730		505,366
1919.....	351,572	45,229	189,893	9,931	1,202		597,827
1920.....	393,582	56,173	188,547	10,867	930	4,302	654,401
1921.....	337,014	45,367	129,392	5,703	722	1,313	519,511
1922.....	483,664	30,458	196,392	13,150		2,644	726,308
Totals.....	3,049,083	845,935 177,227	704,224	94,846	4,144	8,413	4,883,872

Year	Paper Production					
	News-print	Book and Writing	Wrapping	Boards	Other Paper Products	Total
				Tons		
1913.....						
1914.....						
1915.....						
1916.....						
1917.....	316,147	33,445	10,563	19,228	4,172	383,555
1918.....	325,023	30,989	12,388	51,922	4,906	425,228
1919.....	352,254	39,023	10,193	92,355	4,967	498,792
1920.....	380,943	49,066	17,866	103,356	9,533	560,764
1921.....	389,266	38,102	14,016	61,954	4,540	507,878
1922.....	499,201	43,275	18,283	80,605	7,074	648,438
* Totals.....	2,262,834	233,900	83,309	409,420	35,192	3,024,655

The figures in Table Vd clearly indicate the development in individual phases of the industry. Except for fluctuations due to industrial conditions, there has been constant increase in production of ground wood; 1918 and 1921, the only individual years which show decreases, were in turn followed by years of very much greater increases. Figures for production of chemical pulp, also, indicate consistent progress, except in the sulphate and soda processes; of the former it may be said that development has been retarded by restriction in available markets; as for soda pulp, manufacture by this process has never been developed to any great extent.

SESSIONAL PAPER No. 310

TABLE V.E.—ONTARIO LUMBER PRODUCTION 1913 TO 1922 INCLUSIVE, BY KINDS OF WOOD, QUANTITY CUT AND VALUE

Kinds of Wood	1913		1914		1915		1916		1917	
	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value
White pine	516,098	\$ 15,396,269	488,312	\$ 10,158,751	623,119	\$ 12,700,225	604,562	\$ 12,549,487	611,726	\$ 14,870,638
Hemlock	142,731	2,394,986	185,453	2,805,852	107,913	1,560,783	70,112	1,094,507	164,688	3,339,985
Red pine	132,646	2,461,900	85,181	1,474,798	102,776	1,873,955	55,086	1,060,358	91,893	2,266,057
Spruce	104,485	1,597,652	85,738	1,438,200	84,095	1,373,217	65,484	1,186,162	49,477	1,167,918
Maple	61,213	1,107,384	53,266	1,074,007	35,311	653,701	24,395	497,144	12,574	342,922
Elm	27,305	593,853	26,431	560,029	20,266	396,827	13,527	287,338	12,646	263,688
Birch	25,665	512,005	23,153	454,216	15,374	286,042	15,727	311,516	10,421	293,880
Jack pine	24,297	352,510	17,890	268,585	10,597	161,951	17,520	315,107	12,227	278,436
Basswood	22,867	501,959	23,741	502,370	12,452	246,679	8,530	179,698	8,952	228,982
Cedar	9,493	151,484	7,072	120,130	2,659	44,139	2,858	49,032	5,770	79,232
Beech	8,701	145,464	12,026	204,638	3,360	57,548	4,155	71,459	1,809	37,715
Ash	5,677	142,698	5,877	129,917	3,429	71,504	2,219	47,531	3,010	68,352
Oak	5,081	171,324	3,903	120,631	2,335	66,342	2,451	72,749	1,505	60,217
Balsam fir	4,364	66,478	10,878	183,064	4,341	60,431	1,256	18,470	2,271	45,809
Tamarack	4,691	69,324	4,319	65,388	2,959	46,192	2,527	43,158	2,535	51,767
Poplar (Aspen)	1,714	20,879	4,889	55,647	1,465	18,178	1,577	21,963	1,235	24,731
Chestnut	1,307	25,072	1,163	25,842	522	12,043	457	10,898	240	9,633
Poplar (Balsam)	1,060	17,296	2,392	25,597	482	5,911	273	4,143	1,309	22,282
Hickory	625	23,260	900	25,299	203	5,534	144	5,059	53	2,151
Poplar (Cottonwood)	500	5,990	569	8,144	1,492	16,775	945	16,455	641	12,745
Butternut	178	5,100	635	8,594	115	2,892	123	2,781	11	365
Cherry	176	4,635	262	7,866	65	2,095	90	2,552	20	1,334
Black gum	125	3,000	12	168					10	805
Walnut	35	1,617	46	1,727	28	968	32	1,178		
Tulip	20	358	23	412	1	18				
Sycamore	11	255								
Sassafras	1	745								
Other kinds									6,843	67,124
Custom sawing									108,398	1,901,681
Whitewood										
Totals	1,101,066	25,773,407	1,044,131	19,719,972	1,035,341	19,663,950	894,050	17,848,675	1,110,264	25,438,449

Kinds of Wood	1918		1919		1920		1921		1922	
	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value
White pine	585,342	\$ 20,336,885	355,000	\$ 14,938,090	520,206	\$ 24,444,777	398,872	\$ 14,432,709	479,933	\$ 17,271,484
Hemlock	121,638	3,183,841	79,999	2,505,203	89,539	3,236,410	72,460	1,987,203	68,900	1,712,339
Red pine	89,693	2,978,929	80,662	3,084,531	80,511	3,349,339	80,275	2,344,150	62,807	1,871,806
Spruce	64,127	1,931,947	180,487	6,100,925	108,766	4,372,501	44,565	1,258,001	61,205	1,623,744
Maple	24,351	704,743	24,504	954,824	37,012	1,560,912	31,857	1,184,989	20,290	726,034
Elm	13,780	281,083	11,566	432,534	20,954	838,940	14,043	498,941	12,446	433,938
Birch	10,485	349,019	16,791	635,657	24,776	1,108,369	20,798	748,102	15,298	542,902
Jack pine	19,026	530,261	23,808	752,018	44,236	1,629,715	34,326	804,488	28,841	633,010
Basswood	14,247	274,067	11,928	449,157	13,835	569,780	12,688	454,475	9,863	337,000
Cedar	3,230	80,705	3,804	117,143	7,691	259,197	2,833	85,400	2,354	68,955
Beech	3,592	97,979	5,204	170,433	4,531	175,650	3,907	114,895	2,843	84,459
Ash	1,741	54,581	2,476	83,994	3,845	151,463	3,188	106,659	2,351	78,168
Oak	2,296	76,879	1,238	79,548	3,584	164,767	2,267	111,184	1,971	96,661
Balsam fir	2,061	48,408	1,439	48,224	7,102	257,475	1,355	38,106	2,129	60,675
Tamarack	1,387	36,623	1,414	43,012	11,803	482,925	748	21,773	719	20,006
Poplar (Aspen)	3,484	74,969	4,817	150,653	7,352	261,081	5,347	202,517	1,640	45,653
Chestnut	735	22,191	631	21,073	699	33,690	371	18,588	479	22,586
Poplar (Balsam)	1,385	29,009	391	11,824						
Hickory	141	6,185	151	4,366	155	6,115	132	6,234	111	5,857
Poplar (Cottonwood)	82	1,935	242	5,488						
Butternut	26	773	47	1,974	51	2,460	59	2,354	56	1,989
Cherry	41	1,404	164	3,831	155	6,564	104	4,903	88	3,929
Black gum	8	565	13	740	72	4,640	15	1,415	19	887
Walnut										
Tulip									5	150
Sycamore										
Sassafras										
Other kinds	2,250	57,946	3,874	118,592	6,046	225,607	3,844	91,078	1,918	44,084
Custom sawing	144,714	3,007,827	129,549	2,957,550						
Whitewood									14	1,000
Totals	1,110,062	34,168,754	940,199	33,671,384	992,901	43,142,377	734,054	24,518,164	776,280	25,687,280

Table Ve indicates the lumber production from all species, over the period 1913 to 1922. The average yearly production was approximately 974 million feet board measure. In their general trend, the figures show a falling off in production, small but none the less clear-cut. Peak production for the decade centred on the years 1917 and 1918, since when the reduction has occurred.

For the entire period, white pine has furnished 53.2 per cent of the lumber supplies; hemlock, 11.3 per cent; spruce, 9.1 per cent; and red pine about 9 per cent. These four conifers have therefore supplied 82.6 per cent of all the lumber, the balance of the cut coming from jackpine, cedar, balsam, tamarack (aggregating 3.6 per cent) and the hardwoods. Although the total figures give spruce third place, this position was attained by virtue of relatively high cut in two or three individual years; its general position has been fourth, red pine more frequently occupying third rank, and hemlock, second. Perhaps of interest, here, is the fact that jackpine supplies slightly less than 2.4 per cent of sawn lumber. From the foregoing, it is also evident that the cut of hardwood lumber is less than 14 per cent of the total.

• It is necessary to make special reference to the pine situation. Adding together the production for both white and red pine, the total production in ten years was approximately 6,045 million feet,—62.1 per cent of total production, and an average of over 600 million feet per year. Now, the total remaining stand of these species is estimated at some 8 billion feet, board measure. The conclusion is perfectly obvious; for only a few years, may we expect the supplies of mature pine to last, at the present rate of consumption.

The original stand of white and red pine in Ontario is estimated to have contained some 45 billion feet. Since the beginning of the industry in the province, however, lumbering operations have been chiefly directed at exploitation of these two species. In point of geographical location, and by definition of their habitat, they occupied the more accessible regions, and it is but natural that, offering the very highest grades of lumber, they should have been the subject of main interest. As a result of land settlement, the encroachment of hardwoods on cut-over pine lands, but mainly on account of fires on logged-over areas, the reproduction of these species has been prevented on approximately one-half of the original pine-bearing area. On these areas where reproduction of the species has taken place, the new growth is for the most part in the younger age classes, and cannot, therefore, be expected to produce saw-material for many years to come.

Just as white and red pine have, through depletion, passed into relative insignificance in provinces further east, it appears quite clear that we are upon the threshold of a similar experience in Ontario. In a discussion of pulpwood resources, the significance of the serious pine situation lies in the fact that, unless lumber production falls off very perceptibly, we may soon expect, from this direction, a more serious attack on spruce supplies than has so far been experienced. If pine production over the decade be segregated in two five year groups, it is immediately perceived that the average for the later period is much lower than for the first half of the decade. This is undoubtedly due to the fact that supplies are becoming less accessible, and we may with every assurance expect a still further falling off. Unless, therefore, total lumber production is to be seriously curtailed, we may indeed expect larger consumption of other species. Spruce, offering the second largest stand of available coniferous saw-timber, will very naturally be the species of greatest interest.

Anticipating at least some further development in the pulp industry, which is bound to materially increase the consumption of pulpwood, and with an additional drain impending on pulpwood species through lumbering activities, it is abundantly clear that hasty conclusions, based upon figures presented in Section 6, would greatly exaggerate the degree of adequacy in supplies.

SESSIONAL PAPER No. 310

SECTION 8.—TREND OF THE PULPWOOD BUSINESS IN ONTARIO

Except in 1915, when exports were very much greater than in the years preceding it,—higher indeed than exports in each of the 5 years following—the first eight years of the decade show a persistent tendency toward increased exports. It has already been established that average figures for the last half of the decade greatly exceed those of the first five years. In Ontario, therefore, the export trade in pulpwood has had a much greater effect in increasing the cut of spruce than has been the case in Quebec or New Brunswick; exports therefore share, with local pulp manufacture, the responsibility for increased drain on pulpwood resources. This relation is the more obvious when the very large exports for 1923 are considered. Under all the circumstances, we are quite justified in the conclusion reached,—that we may expect even greater demands upon existing supplies.

In the year covered by the Census, the local pulp manufacturers cut from their own limits some 612,893 cords of wood. On the other hand 329,779 cords were purchased from other sources. In the same year the farmers of the province produced and sold 249,237 cords. It is immediately noticeable that, in Ontario, a situation, entirely different to that in other provinces, exists; namely, the pulp mills actually buy more than the total quantity produced by farmers and settlers. It is therefore clear that large quantities were purchased from wood-cutters other than farmers. It will be remembered that 1920 was a year of very active pulpwood operations on the farms, prices being at a peak; it is therefore improbable that the farms had ever produced so much pulpwood as they did in that year. Notwithstanding this fact, the amount purchased by the mills in 1920 represented a falling-off of approximately 100,000 cords from the amount purchased in 1919, and even 1918 (a year of moderate production of pulp) showed very large purchases by the mills. Two deductions are obvious, (1) that the impetus to production of pulpwood on the farms has been induced by the possibilities of export trade, brought about by the increased activities of American pulpwood buyers on this side of the line; and (2) that, altogether aside from prices which may be offered by the respective parties, and aside from the question of locality, there exists within the province a demand for purchased spruce and balsam very materially in excess of the amount of those species cut by the farmers and settlers. That the first is true, may be freely conceded; as for the second, it is only necessary to observe that in the six year period 1917 to 1922 Ontario mills purchased wood at the yearly average rate of 295,000 cords. Even taking the unprecedented exports of 1923, and assuming that the startling increase was due to farm wood-cutting activities; conceding further, that the proportion of poplar (unused to any extent in Canada) remained as low as in previous years, namely 36 per cent; it is at once apparent that the average annual purchases of Ontario mills greatly exceed the amount of spruce and balsam entering into exports, derived by eliminating poplar on the foregoing basis.

In view of the peculiar circumstances previously related, it is manifestly difficult to determine with any degree of accuracy the percentage of farmers' wood entering into exports. On the one hand, it is well known that, particularly in the north country, considerable numbers of wood contractors other than farmers engage in the operation of timberlands held specifically for that purpose; on the other hand, it is equally well known that in the aggregate the mills purchase large quantities of wood from farmers. In 1923, undoubtedly, the percentage of farmers' wood to total exports was high. For more normal years, represented by an average net export of 180,000 cords, however, it is considered that not more than from 40 to 50 per cent of the exports, if that much, consisted of wood cut by farmers or settlers.

It is quite clear that in the province market already exists for the disposal of spruce and balsam pulpwood, and that the market is already taken advantage of to a material extent by farmers and settlers. It is also quite clear that the pulp companies, having for the most part large timber holdings at their disposal, purchase wood from other sources to a much greater extent than is the case in Quebec; that they do so, may also be taken as an indication that they are endeavouring to conserve their own supplies.

SECTION 9.—SUMMARY OF SITUATION—DURATION OF SUPPLIES

If only to permit study of the situation, it is proposed, for this province also, to analyse the results secured by application of the theory of 'ultimate exhaustion.*' The total available spruce-balsam stand is 84.5 million cords, and the total annual consumption 1.2 million cords; the quotient, 70 years, represents the time that supplies might be expected to last, were it not for other factors in depletion. For spruce alone, the stand is 75 million cords and annual consumption 1.12 million cords,—67 years' supply, in the same premises.

In Ontario similar difficulties are met with in discussion of increment, as elsewhere. Conditions for regeneration and for growth, however, are very similar to those which obtain in the province of Quebec; and certainly there is no justification for taking a rate higher than one per cent, if even that figure is justified. The problem must be dealt with, however, and in the lack of data which would compel the use of a lower rate, one per cent is adopted for further calculations.

Applying this rate to the total spruce-balsam stand of 127.50 million cords (just as liberal an application as was made in Quebec, and equally open to question) the annual increment would be 1.275 million cords,—in this province, apparently a little greater than consumption, and undoubtedly due to the fact that spruce is not used to the same extent for lumber as is the case in Quebec. A slightly increased use in that direction—which is entirely probable as a result of white pine depletion—would bring consumption into balance with the assumed increment. For the purpose of discussion, therefore, we may say that there is approximate balance between the two. All other factors in depletion—fire, insects and decay—therefore represent *net* depletion.

During the past five years the average area of timber lands burned annually has been approximately 670,000 acres, of which 210,000 acres was merchantable timber; 270,000 acres young growth; and 190,000 acres cut-over lands. Making proper allowance for species other than pulpwood, and applying very conservative figures as to stands, the average loss of the pulpwood species has been at least 1 million cords per year, a portion of which is subject to salvage. Fortunately the province has not suffered from a budworm epidemic in any way approaching the widespread severity that was experienced in Quebec and New Brunswick; more limited losses have been suffered, however, to a total of perhaps 5 million cords in all. Consequently over a ten-year period an average annual loss through budworm has been about half a million cords. No estimate is possible for damage by other insects, although continuous loss is caused thereby. For the material losses by fungi, also, no figures are available.

It will at once be perceived that the aggregate of all these losses is very much higher than the amount annually consumed in actual utilization; it is also much greater than annual increment. Consequently, neglecting a probable increase in consumption, the net annual wastage through all factors of depletion will result in reduction in supplies at a much more rapid rate than that indicated by the simple division of the amount annually used into the amount of the total available stand.

*See also Section 10, Chapter II.

SESSIONAL PAPER No. 310

As previously inferred, unless the lumber industry is to go into decline, it may definitely be expected that a greater amount of spruce will be used in the sawmills of the province. Also, at least some further expansion may be expected in the pulp industry. Under such circumstances, an unfavourable balance between increment and consumption is almost bound to develop.

In conclusion it may be stated that the large net depletion involves serious inroads upon wood capital, which condition is absolutely inimical to the permanence of the lumber and pulp industries. If these industries are to maintain the important position they now hold in the industrial life of the province, there are two main problems which must be faced in a very practical and very energetic way; (1) material reduction in the amounts of losses through fire and insects; and (2) regulation of cutting operations in such a manner that the yearly consumption will be kept within the limits of net annual increment.

CHAPTER VI.—MANITOBA

Coming to western Canada we encounter a distinct change in forest conditions, and also in the manner and extent to which the forest resources have been subjected to exploitation. The forest of Manitoba is much less complex in composition, consisting essentially in a spruce-jackpine-poplar forest with relatively small proportion of other species such as tamarac, balsam and white birch. While a few other hardwoods are found in the southern half of the province, this is the westerly and northerly limit of such species. The distribution of the forest also is quite different from that in Eastern Canada, in that there is a more or less distinct line of demarcation between the absolutely open lands—the prairie—and the wooded country. So far as forest industry is concerned, it has been confined almost entirely to lumbering operations. No pulp mills have as yet been established, and the only activity in the direction of pulpwood has been in taking out relatively small amounts for mills farther east in Ontario, and for export to the United States. It should therefore be kept in mind that in the following discussion of pulpwood resources the subject is treated on the basis of potentialities rather than actualities.

SECTION 1.—TOTAL PULPWOOD RESOURCES

Manitoba has a land area of 229,332 square miles, of which the forest area is 137,600 square miles, or approximately 60 per cent. Of the latter some 27,600 square miles (20 per cent) is classified as merchantable and accessible, the balance, 110,000 square miles, consisting of unmerchantable forest.

On the entire forest area, there is estimated to be a total stand of 71,850,000 cords of the four species, spruce, balsam, jackpine and poplar, which is used for this purpose, and aside from the question of actual accessibility, would be available as pulpwood. It will be noted that hemlock has disappeared, as this species is not native to Manitoba. Of the foregoing amount, jackpine is present to the extent of 20,500,000 cords, and poplar to the amount of 28,200,000 cords, these two species aggregating over 67 per cent of the total estimated stand.

The resources of Manitoba have been subjected to severe exploitation for saw-timber, and also, by reason of extensive railway construction, to operation for railway ties as intimated in the introductory paragraph, however, operations for pulpwood have been confined exclusively to a relatively small amount, originating largely in the peninsula between Lakes Winnipeg and Manitoba and in the southeastern portion of the province.

14-15 GEORGE V, A. 1924

A large portion of the pulpwood resources above stated consist in very sparsely timbered areas from which, under present conditions or under conditions of development which can reasonably be anticipated, will hardly develop a market. The total amount considered to be available and merchantable within the near future is 27,500,000 cords of the four species. Of this amount spruce and balsam, the only species in great demand for pulp manufacture elsewhere in Canada, are present to the extent of $9\frac{1}{2}$ million cords.

SECTION 2—PULPWOOD UNDER EXCLUSIVE CONTROL OF THE DOMINION

In this province ownership of the forest resources lies in the Crown, in the right of the Dominion of Canada. Until very recent years, the disposal of timber by the federal government had been confined to the licensing of timber berths to supply sawmill operations; to supply tie and other construction timber for railways; and finally, under a system of permits, to provide settlers with timber for buildings and other structures consequent upon the settlement of lands for farming purposes. As a result of these developments the greater part of the accessible saw and tie timber has been alienated so far as the merchantable material is concerned. Moreover, to a greater extent the timber rights so demised have been intensively used, and consequently there has been a notable reduction in the timber resources.

The Dominion, however, still retains unimpaired title to over 92 per cent (127,021 square miles) of the forest area of the province. On this area the total stand of all species under review is estimated to be 65.7 million cords, only 20.6 million cords of which, however, are of spruce and balsam. Further, of the latter, approximately 7 million cords, only, may be considered as merchantable; the balance is either far too remote, or is in such thin stands, that it cannot be given serious consideration for many years to come.

SECTION 3—PULPWOOD UNDER REGULATIVE CONTROL OF THE DOMINION

An area approximating 2,100 square miles has been disposed of in the form of licenses and berths, the total stand thereon being estimated at about 3.67 million cords. Of the latter nearly 2 million cords is of spruce and balsam. All timber so disposed of, however, is subject to conditions requiring manufacture in Canada. Also, it is subject to regulation of the Crown as to methods under which it shall be operated.

It is of interest to note here, that about three years ago, a tract of some 720 square miles, lying to the east of Lake Winnipeg, was disposed of as "Pulpwood Berth No. 1". Later, an extension to the area was granted by Order in Council, but so far no operations have taken place.

SECTION 4—PULPWOOD ON PRIVATELY OWNED LANDS

An area of 8,484 square miles, comprising 6.17 per cent of the total forest area of the province has been disposed of in fee simple,—to the railway companies, as subsidies; as grants to the Hudson's Bay Company; and to settlers taking up land. On these private lands the total stand is 2.45 million cords, of which a little better than one-half million cords is available spruce and balsam. Under present conditions, all of this timber carries the privilege of export, although relatively little has heretofore been exploited for that purpose.

Of the area privately owned, some 800 square miles is owned by the railways and the Hudson's Bay Company, and 4,600 square miles by settlers, and the ownership is therefore essentially Canadian. The balance is a miscellany of private holdings the controlling classes of which it is not possible to segregate.

SESSIONAL PAPER No. 310

SECTION 5—SUMMARY *RE* FEDERAL CONTROL OF EXPORTS

From the foregoing discussion, it is manifest that in Manitoba, by reason of manufacturing restrictions imposed upon all except privately owned timber, the Dominion Government already effectively prevents the export of unmanufactured pulpwood. In effect, this restriction applies to all except 3.4 per cent of the total stand, and to all but 5.4 per cent of the merchantable balsam and spruce timber available.

SECTION 6—CONSUMPTION OF TIMBER IN MANITOBA

Table I indicates that the total stand of soft-wood saw-timber in the province is 2,335 million feet, board measure. Of this amount, spruce contributes 2,000 million; jackpine 250 million; balsam 75 million; the balance of 10 million consisting of other softwood species of relatively little importance. These amounts, however, are included in the totals in cordwood measure. Of spruce and balsam, therefore, there is available for all purposes approximately 9½ million cords.

Up to the present time there has never been a cord of wood converted into pulp in Manitoba, and at the present time there is only to be considered, therefore, the consumption for lumber and other purposes, and for exports. Table VI gives the amount of spruce manufactured over the decade, expressed in cords.

TABLE VI.—SPRUCE MANUFACTURED INTO LUMBER—MANITOBA

Expressed in Cords - 500 Bd. Ft. = 1 cord

Year	Spruce
1913.....	129,234
1914.....	81,278
1915.....	78,772
1916.....	111,482
1917.....	105,168
1918.....	100,440
1919.....	55,856
1920.....	112,220
1921.....	120,846
1922.....	106,312
Total.....	1,001,608
Average.....	100,161

NOTE.—In only one year of the decade, viz., 1917, was balsam reported to have been manufactured, and then only to the extent of 20,000 feet B.M. This species is therefore eliminated from the table.

It appears that the average annual consumption of the species for lumber has been approximately 100,000 cords. While the average production for the first five years of the decade is perceptibly higher than for the second half, and this may partly be attributed to falling-off in supplies, it is in greater measure due to decrease in the demand of local markets. The figure of 100,000 cords may manifestly be taken as a fair average.

So far as exports of pulpwood are concerned, the customs figures for wood handled through Manitoba ports of exit indicate so few shipments that it is not necessary to include a table similar to that for other provinces. For instance, customs figures, even for 1923, indicate an export of only 80 cords, while data for previous years is also fragmentary in character. On the other hand, it is well known that in recent years the cutting of pulpwood in, and shipment from, the province, has reached material proportions. As a result of evidence presented to the Commission, and on the basis of study of interprovincial traffic

in pulpwood for export, it is considered that we may definitely figure upon an annual export of from thirty to forty thousand cords, practically all of which goes out through Fort Frances, Ontario.

In regard to uses for other purposes such as railway ties, construction timber, fuel, etc., detailed statistics are lacking. Spruce particularly, however, is used to a far greater extent on the prairies for such purposes than is the case further east. It is conservatively estimated that at least 80,000 cords of the species is consumed as fuel, and that an additional 10,000 cords is used for railway ties and construction timber. While these figures are entirely in the nature of rough estimates, it is fully believed that they are, if anything, too conservative.

Summing up the consumption of balsam and spruce for all purposes, it is quite clear that from 200,000 to 230,000 cords, at least, represents the average annual consumption of the species. As previously pointed out the total available and merchantable stand is $9\frac{1}{2}$ million cords, and from this amount the supplies required must be drawn.

SECTION 7.—THE EXTENT OF THE LUMBER INDUSTRY

Table VIa indicates clearly the lumber production of the industry in Manitoba. The outstanding feature is that spruce is, relatively speaking, the only species of importance in sawmill production of the province, furnishing over 94 per cent of all lumber produced. To a limited extent jackpine, tamarack, and poplar have been used, and, by reason of diminution in the quantity of available spruce suitable for sawing, it may definitely be anticipated that other species may come into greater use.

For the entire time during which statistics have been collected, i.e., since 1908, the year 1913 showed the peak in lumber production. As far as can be ascertained, in no year previous to 1908 did production reach the figure of 1913. It seems improbable, moreover, that it will for years attain that figure again, for, after all, the readily accessible stands have been seriously depleted. With the great increase in production in British Columbia, due to the bounteous supplies of high-grade timber, and to the introduction of large-scale methods, the producers of the latter province have invaded the prairie market to a very large extent. It is therefore probable that the Manitoba mills will be more or less restricted in their markets to supplying local demands, with a limited export to neighbouring states just south of the International Boundary.

SECTION 8.—THE TREND OF PULPWOOD BUSINESS IN MANITOBA

It has previously been explained that at present the pulpwood business in Manitoba is entirely confined to the export trade. To a far greater extent, the wood which is so cut comes from farmers and settlers engaged in clearing, and these operations are more or less confined to the southeastern part of the province, the peninsula between Lakes Winnipeg and Manitoba, and to the Dauphin district.

Most assuredly, however, it is to be expected that the near future will witness the introduction of pulp manufacturing within the province. Already one pulp concession has been made and extended, and from time to time interest is displayed in other tracts deemed suitable for ventures of this character. It may be pointed out that the introduction of one mill of a 100-ton capacity, basing production on newsprint, will involve additional consumption of about 40,000 cords annually. After all, the pulpwood resources of the province are, at best, rather slender, and it is accordingly of the utmost importance that the government should scrutinize most carefully the beginning of operations in this province, and ought not to permit over-development such as has occurred in some

SESSIONAL PAPER No. 310

other regions. Aside from the patent desirability of developing export trade (so far as the natural resources will permit, on a perpetual basis) it is altogether doubtful if more than one such mill would be required to supply the present newsprint requirements of the three prairie provinces; the annual consumption of newsprint between Manitoba and the Rockies is only about 55 or 60 tons. In development of the industry, therefore, it is readily perceived that caution should be exercised, with the idea in view that those industries which are developed will be of such size and so located that the available resources of raw materials will supply their requirements in perpetuity.

TABLE VIa.—MANITOBA LUMBER PRODUCTION, 1913 TO 1922 INCLUSIVE BY KINDS OF WOOD, QUANTITY CUT AND VALUE

Kinds of Wood	1913		1914		1915		1916		1917	
	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value
Spruce.....	64,617	\$ 858,007	40,639	\$ 543,886	39,386	\$ 506,289	55,741	\$ 824,554	52,584	\$ 928,350
Jack Pine.....	2,783	32,585	201	2,824	465	6,491	148	2,500	92	1,460
Tamarack.....	2,172	27,544	3,096	45,602	1,584	23,858	470	6,346	280	5,280
Poplar (Aspen).....	2,066	23,681	394	5,074	797	10,693	202	2,436	340	4,946
Poplar (Balsam).....	268	3,210	120	1,362	94	1,509	112	1,187	108	2,140
Birch.....	27	771	2	40	9	210	5	113	10	300
Oak.....	26	624	11	572	16	240	17	488	30	1,300
Cedar.....	1	18					1	15		
Elm.....	1	18	12	216	6	140	3	70	80	2,400
Poplar (Cottonwood).....			183	2,152			1,012	13,170		
White Pine.....									160	4,750
Basswood.....									120	3,360
Ash.....									28	450
Maple.....									20	900
Balsam Fir.....									10	220
Other Kinds.....									260	4,720
Custom sawing.....									94	1,570
Poplar, all kinds.....										
Totals.....	71,961	946,458	44,658	601,728	42,357	549,430	57,711	850,879	54,216	962,146

Kinds of Wood	1918		1919		1920		1921		1922	
	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value
Spruce.....	50,220	\$ 1,154,847	27,928	\$ 877,745	56,110	\$ 1,981,396	60,423	\$ 1,369,884	53,156	\$ 1,327,793
Jack Pine.....	86	1,560	179	4,705	577	17,530	69	1,264	159	3,343
Tamarack.....	241	5,770	444	12,773	260	10,140	278	5,950	1,057	24,482
Poplar (Aspen).....	528	10,915	301	10,419						
Poplar (Balsam).....	2,070	48,880	52	1,540						
Birch.....	6	160	4	210	286	12,900				
Oak.....			4	160			4	200		
Cedar.....										
Elm.....							12	360	400	12,000
Poplar (Cottonwood).....									158	3,444
White Pine.....										
Basswood.....										
Ash.....										
Maple.....										
Balsam Fir.....	400	8,000			10	350				
Other Kinds.....										
Custom sawing.....	496	9,920	1,441	30,127						
Poplar, all kinds.....					1,176	36,274	941	20,409		
Totals.....	54,047	1,240,052	30,353	937,679	58,419	2,058,590	61,727	1,398,067	54,930	1,371,062

SECTION 9.—SUMMARY OF SITUATION—DURATION OF SUPPLIES

✓ When the area of forest is considered, it is quite evident that the lumber industry has never been developed to large proportions; the obvious reason being, that the timber available has not been such as to enable the province to compete in outside markets with the lumber from British Columbia and the eastern provinces.

Although the average fire menace in Manitoba cannot be considered a serious one, the province has on numerous occasions been subjected to extreme climatic conditions, and enormous damage has been wrought by forest fires. Over the five-year period, 1918-22, the average area of timber land burned was approximately 85,000 acres; of which 37,000 acres carried merchantable timber; 40,500 acres was young growth; and 7,500 acres consisted in cut-over lands. The average annual loss in merchantable timber was 110 million feet, board measure. It is therefore quite evident that, when young growth destroyed is taken into consideration, the annual fire loss was probably in the neighbourhood of 275 or 300 thousand cords, all species included.

In a previous section the annual consumption of spruce is placed at from 200 to 230 thousand cords. If to this figure then were to be added the amounts of other species consumed for all purposes, it will be seen that the amount of wood actually used exceeds the quantity which was destroyed annually in the period referred to. At the same time, it is very obvious the fire losses constituted a very serious part of the total depletion.

Although the province has always suffered to some extent from insect infestations, there has been nothing approaching the budworm epidemic experienced in the east. The larch sawfly did great damage to the tamarack stand thirty or thirty-five years ago, but since that time no general epidemic has affected the more valuable species.

While annual increment in the accessible and merchantable spruce-balsam stand cannot by any means be considered to measure up to the amount of these species annually utilized, there is a possibility that increment on the entire stand may reach close to the amount used, and, in such circumstances, fire and other losses constitute net depletion. For this reason, the outstanding problem facing the government lies in the curtailment of such losses. The success of any further development in forest industry, particularly in pulp manufacture, is almost entirely contingent upon a more successful and more complete scheme of fire protection.

CHAPTER VII.—SASKATCHEWAN

In Saskatchewan, forest types are very similar to those in Manitoba. The number of species of importance is very small, and there is also a fairly clear line of demarcation between the prairie region to the south and the timbered region to the north. Forest industries in this province, also, have been almost entirely confined to lumbering, tie, and fuel operations; with the exception of one or two isolated cases, during the period of peak prices in the pulpwood markets, this province has never produced pulpwood either for export or for domestic consumption.

SECTION 1—TOTAL PULPWOOD RESOURCES

The land area of the province is 237,500 square miles, of which amount 49,776 square miles (21 per cent) is classified as forest land. It is at once noticeable that the forest area of this province is much less than that of Manitoba, due to the fact that, extending clear across the southern half of the province, is a solid belt of almost exclusively agricultural land. Of the forest area some 25,000

SESSIONAL PAPER No. 310

square miles (52 per cent) carries timber considered to be merchantable and accessible from the standpoint of pulpwood operations, at present or within reasonable time in the future. The balance 24,076 square miles, consists in very sparsely timbered areas for which no value can be foreseen.

The total pulpwood stand of the province is estimated at 155,550,000 cords of spruce, balsam, jackpine and poplar. Of this amount 123,100,000 cords is jackpine and poplar, and 32,450,000 cords is spruce and balsam. These figures, however, include very thin stands which are entirely incapable of successful exploitation. The total accessible and merchantable stand is estimated at 48,600,000 cords, of which some 13,600,000 cords is of spruce and balsam.

SECTION 2.—PULPWOOD UNDER EXCLUSIVE CONTROL OF THE DOMINION

As in Manitoba, the federal government controls the forest resources of the province. For many years past, the disposal of timber cutting privileges has been on the license system, the Crown retaining title to the soil, and also retaining the right of control over cutting operations. Along similar lines, permits have for years been granted to cover tie and construction timber operations of railways, and also to settlers requiring wood for their buildings and other structures. By far the greater part of the original saw-timber stand has been disposed of; in fact, it has been very largely cut out.

The government, however, still retains full title to a forest area of 43,335 square miles,—87 per cent of the total. On this area the estimated total stand of spruce, balsam, jackpine, and poplar is 143.3 million cords. Only 29.7 million cords is spruce and balsam, however, and of the latter some 10.88 million cords is reasonably accessible and will probably be exploitable within reasonable time. For the balance of the material, it is impossible to foresee any markets which would justify its consideration even as potential supplies.

SECTION 3.—PULPWOOD UNDER REGULATIVE CONTROL OF THE DOMINION

The area under timber license and permit in Saskatchewan approximates 1,175 square miles,—between 2 and 2½ per cent of the forest area. The area in this category was formerly much greater, but large tracts culled over in lumbering operations have been abandoned, greatly reducing the area under license. For the area remaining under this temporary form of alienation, the total stand is estimated at approximately 7 million cords of all species; of this, spruce and balsam total 1.46 million cords of accessible pulpwood.

To all of this licensed timber, the requirement for local manufacture applies, and, consequently, it is under prohibition for export purposes.

SECTION 4.—PULPWOOD ON PRIVATELY OWNED LANDS

The area of timberland alienated outright is some 5,266 square miles, embracing about 10.6 per cent of the forest. This area carries a total stand of 5.15 million cords of all species, of which 1¼ million cords includes all of the spruce and balsam which could be considered available for pulpwood.

Of the total area so demised, 1,083 square miles is controlled by the Hudsons Bay Company, the railways and other companies, in the larger holdings. Of the balance, some 3,042 square miles is held by settlers, and 763 square miles in miscellaneous holdings. The exact character of control it has not been feasible to determine, but to a greater extent they appear to be under essentially Canadian control.

- - - - -

SECTION 5.—SUMMARY *RE* FEDERAL CONTROL OF EXPORTS

From preceding discussion it is quite evident that, by virtue of outright control on 87 per cent of the forest area, and by reason of manufacturing restrictions on timberlands held under license or permit, the government already rather effectually prevents the export of unmanufactured wood. Indeed, such restrictions apply to over 96 per cent of the total stand, and to over 90 per cent of the available stand of spruce and balsam.

SECTION 6.—CONSUMPTION OF TIMBER IN SASKATCHEWAN

As indicated in Table 1, the total stand of softwood saw-timber is estimated at 3.95 billion feet, board measure, including 3 billion feet of spruce, 800 million feet of jackpine, 100 million feet of balsam, and 50 million feet of other softwoods of relatively small importance.

TABLE VII.—SPRUCE MANUFACTURED INTO LUMBER.—SASKATCHEWAN

Expressed in Cords - 500 Bd. Ft. = 1 cord

Year	Spruce
1913.....	225,500
1914.....	111,364
1915.....	127,940
1916.....	168,268
1917.....	176,306
1918.....	151,670
1919.....	84,904
1920.....	108,742
1921.....	21,784
1922.....	19,218
Total.....	1,195,696
Average.....	119,570

NOTE.—No balsam is reported to have been cut, and this species is therefore deleted from the table.

Table VII gives the consumption of spruce in lumber manufacture over the decade, expressed in cords. Table VIIa gives the lumber cut of all species. Reference to the latter table reveals the fact that in Saskatchewan, also, spruce has been the mainstay of the lumber industry, having furnished over 99 per cent of the supplies. The average annual consumption of spruce, for lumber, has been approximately 120,000 cords.

So far as past consumption is concerned, operations for pulpwood may be neglected, as the very isolated cases in which this product has been cut and exported do not affect to any degree the figures for total consumption. Of great importance, however, is the consumption in other directions. Material amounts of spruce are consumed as fuel, railway ties, construction timber, and also for a miscellany of purposes in connection with improvements in the settlements. It is estimated that at least 80,000 cords is used for fuel and an additional 12,000 cords for railway ties. It is therefore probable that the total spruce consumption for these and miscellaneous purposes approximates 100,000 cords. Accordingly, it appears that the average consumption of spruce in the province reaches a total of some 220,000 cords per annum. The total available stand of this species is 13½ million cords, from which the supplies to fill requirements for all purposes must be drawn.

SESSIONAL PAPER No. 310

SECTION 7.—THE EXTENT OF THE LUMBER INDUSTRY

Upon reference to Table VIIa, it will be seen that, with a peak production in 1913, there has been a serious falling-off in lumber manufacture. For the whole period over which statistics have been collected, that is from 1908 onward, the absolute peak in production occurred in 1912. The preceding year was also one of relatively high production. It is manifest, therefore, that in Saskatchewan, the three years centring on 1913 showed the highest development in the lumber industry. This was followed by a decided reduction, until in recent years production has been very low. The cause is not far to seek; at the beginning of the decade two very large mills were in almost constant operation, the industry being centred at Prince Albert and Big River. With the exhaustion of supplies on limits held by them, and the impossibility of securing additional supplies within reasonable distance, the operators of large mills simply wound up their business. The result is that at the present time there is not a large saw-mill in the province, the large-scale operators having ceded the industry to the operators of smaller outfits. It seems entirely doubtful that the industry will be rejuvenated on a large-scale basis. Although there are still some good tracts of saw-timber available, they are rather inaccessible, and in any case, by reason of topographic conditions, they are more likely to be operated from the Manitoba end. Another feature which has retarded lumbering development in this province has been the invasion of Saskatchewan markets by timber from British Columbia.

TABLE VIIa.—SASKATCHEWAN LUMBER PRODUCTION, 1913 TO 1922 INCLUSIVE, BY KINDS OF WOOD, QUANTITY CUT AND VALUE

Kinds of Wood	1913		1914		1915		1916		1917	
	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value
Spruce.....	112,750	\$ 1,878,352	55,682	\$ 828,162	61,970	\$ 867,612	84,134	\$ 1,187,054	88,153	\$ 2,031,669
Tamarack.....	1,813	27,193	844	12,675	650	9,500	61	1,095		
Jack Pine.....	206	2,472	146	1,752	124	1,741	21	375		
Poplar (Aspen).....	31	465	5	75	105	1,325	59	827	194	3,810
Poplar (Balsam).....					15	175				
Poplar (Cottonwood).....									3	50
Custom Sawing.....									25	500
Poplar (all kinds).....										
White Birch.....										
Totals.....	114,800	1,908,482	56,677	842,664	62,864	880,353	84,275	1,189,351	88,375	2,036,029

Kinds of Wood	1918		1919		1920		1921		1922	
	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value
Spruce.....	75,501	\$ 2,115,694	41,358	\$ 1,294,348	53,268	\$ 2,034,524	10,346	\$ 259,455	9,222	\$ 273,179
Tamarack.....			90	2,700	628	23,120	400	10,000	210	6,200
Jack Pine.....					396	13,907	55	1,347	148	3,718
Poplar (Aspen).....	14	218								
Poplar (Balsam).....										
Poplar (Cottonwood).....									4	75
Custom Sawing.....	320	6,395	1,004	29,640						
Poplar (all kinds).....					79	3,070	91	2,291		
White Birch.....									25	750
Totals.....	75,835	2,122,307	42,452	1,326,688	54,371	2,074,621	10,892	273,093	9,609	283,922

14-15 GEORGE V, A. 1924

SECTION 8—THE TREND OF PULPWOOD BUSINESS IN SASKATCHEWAN

As previously inferred, no such business exists at the present time. Some fourteen years ago, when hopes ran high as to the success of a power development near Prince Albert, there was a flurry of excitement regarding the possibilities of pulp manufacturing in the district. With the failure of the power scheme, however, such hopes were shattered. Since then, there have on various occasions been mere suggestions as to possible pulp mill promotions in the northern country. While there may be possibility of development of this character, the supplies available are limited and rather widely distributed. Certainly, on the basis of present methods of handling timber lands, the resources of the province cannot support local pulp industries of large proportions.

Lying so far north, the timber areas of this province are very remote from pulpwood markets of the present day. Even during the period of peak prices, shipments were very limited. It is quite conceivable, however, that with depletion of supplies at closer range to the pulp mills of the northern middle States, a market might develop in that direction if export were to be permitted. Of more importance and greater benefit, however, would be the development of a market in Manitoba if the industry becomes established in that province.

SECTION 9—SUMMARY OF SITUATION—DURATION OF SUPPLIES

As previously implied, it is altogether probable that, until such time as economic conditions permit the handling of timber on the basis of sustained yield, and the greater care in treatment called for under such a system of management is accorded, lumber production in Saskatchewan has passed the peak. It was never very large on account of the fact that, as in Manitoba operators were more or less restricted in markets by competition from elsewhere.

Fire losses have been very severe in this province, the menace being greater than that obtaining in Manitoba. Over the five-year period, an average upwards of 600,000 acres was burned over annually,—260,000 acres bearing merchantable timber; 300,000 acres being young growth; and some 40,000 acres cut-over timber land. The annual loss in merchantable timber approximated 1 billion feet board measure, all species included. It has previously been shown that annual utilization of spruce and balsam is about 220,000 cords; so that, aside from the young growth destroyed, the average annual fire loss in the period referred to was over twice the amount of spruce and balsam utilized yearly. It is therefore quite certain that annual losses to the spruce-balsam stand, through fire, greatly exceeded the depletion in supplies through legitimate utilization.

Annual utilization of the two species greatly exceeds the amount of annual increment in the merchantable and accessible stand; in fact it probably reaches close to the total increment in the entire stand of these species, regardless of accessibility or merchantability. All fire losses therefore constitute a net depletion. As for other factors in wastage—insects, fungi, etc.—while no widespread epidemics have occurred in the really merchantable species other than tamarac, these pests are always present and contribute materially to deterioration in the stands.

As in Manitoba, it is at once obvious that the problem in this province lies in solution of the fire problem and in the more conservative treatment of timber resources which remain.

CHAPTER VIII.—ALBERTA

With the exception of the east slope of the Rocky Mountains, the only important change in type in the Alberta forest, as compared to that of Saskatchewan, is in the introduction of another species, lodgepole pine, which may be considered as the counterpart of the jackpine which extends eastward to the Atlantic. In the Rocky Mountains several other species are introduced, the only one of importance from the standpoint of the present discussion being Engelmann spruce; the latter may be considered as the counterpart of white spruce with which we have to a great extent been dealing. Within the province, both species of pine and both species of spruce, referred to, are found, their limits of distribution overlapping to a considerable extent.

In the more accessible parts of the province the timbered areas have been very severely culled in lumbering. Also, by reason of the extensive coal mining industry, large amounts of timber have been consumed as pit props. Furthermore, with a large mileage of railway construction, extensive areas have been exploited almost exclusively under the very wasteful and rather destructive process of tie-manufacture.

SECTION 1—TOTAL PULPWOOD RESOURCES

With a land area totalling 248,548 square miles the area classified as forest land is 86,650 square miles, approximately 35 per cent. Of the latter, over 69 per cent is classified as merchantable and accessible forest, the balance being either so remote or so sparsely timbered as to be considered entirely unprofitable.

The total pulpwood stand is estimated at 275,000,000 cords, over 70 per cent of which is jackpine and poplar, leaving some 80,000,000 cords of spruce and balsam. Confining ourselves to the merchantable and accessible stand, however, the total for all species is 81,000,000 cords, of which only 26,000,000 cords of spruce and balsam are available.

**SECTION 2—PULPWOOD UNDER EXCLUSIVE CONTROL
OF THE DOMINION**

As in other prairie provinces, in Alberta control of the forest resources lies with the federal government, and the methods under which timber has been disposed of for lumbering, for railway construction, and to settlers, are identical with those already described for Manitoba and Saskatchewan. While probably the proportion of merchantable saw-timber which has been alienated in this manner is not so great as in the other two provinces, it is nevertheless the case that the greater part of the accessible stands have been disposed of.

The government, however, still retains unimpaired title to 71,054 square miles, representing 82 per cent of the total forest area. The stand of spruce, balsam, jackpine and poplar on this unalienated area is estimated at 261.3 million cords. Of the latter the amount of spruce and balsam is approximately 76.5 million cords, of which 22.5 million cords only may be considered as reasonably accessible and merchantable. Estimates for the total stand in Alberta naturally include many large areas which for many years to come will be absolutely inaccessible, and there are also other areas which are so sparsely timbered as to render them entirely incapable of successful commercial exploitation.

SECTION 3—PULPWOOD UNDER REGULATIVE CONTROL OF THE DOMINION

19,091 square miles within the province have been disposed of under the system of licenses and permits, representing about 2.3 per cent of the entire forest area. Here also, however, large areas which at one time were under this temporary form of alienation have, after being exploited, been abandoned and reverted to the Crown.

The total stand on licensed and permit lands is estimated at 7.28 million cords for all species; of this spruce and balsam total approximately 1.88 million cords of accessible pulpwood. By reason of manufacturing clauses contained in the regulations applying to timber licenses and permits on Dominion lands, all the timber in this category is prohibited from export.

SECTION 4—PULPWOOD ON PRIVATELY OWNED LANDS.

The area of timber land which has been completely alienated is 13,605 square miles, embracing approximately 15.7 per cent of the total forest area. The total stand of all species is approximately 6.38 million cords, of which somewhat better than 1.6 million cords is available spruce and balsam.

By far the greater part of the alienated timber land, namely 10,044 square miles, is held by settlers, and hence may be considered as being essentially under Canadian control. The Hudson's Bay Company and the railways control some 872 square miles, and this area, therefore, falls in the same category so far as control is concerned, 1,328 square miles is held by companies and individuals other than those previously mentioned. For the latter lands it has not been feasible to determine the character of control. For the entire alienated area, however, it appears quite clear that control is essentially Canadian in character.

SECTION 5—SUMMARY RE FEDERAL CONTROL OF EXPORTS

The conclusion to be drawn from the foregoing is that by reason of outright control of operating conditions on 82 per cent of the forest area, and also by application of manufacturing restrictions on lands held under license or permit, the export of unmanufactured wood is already rather effectually prevented. From the standpoint of timber quantities, the export restrictions apply to approximately 95 per cent of the total stand, and to over 93 per cent of the available spruce and balsam.

SECTION 6—CONSUMPTION OF TIMBER IN ALBERTA.

Reference to Table I indicates that the total stand of saw-timber in the province is estimated at 11.7 billion feet, board measure. This quantity includes 8.5 billion feet of spruce, 2.5 billion feet of jackpine, .2 billion feet of balsam. The balance of one-half billion feet is made up of Douglas fir, larch and other coniferous species in relatively small quantities and of no great importance from the standpoint of the present discussion.

Table VIII gives the consumption of spruce and balsam in the manufacture of lumber during the decade. Upon consideration of figures in Table VIIIa, it is noticeable that in Alberta the proportion of other species sawn is somewhat higher than is the case in Saskatchewan and Manitoba. Particularly is this the case with jackpine; also, Douglas fir, being available in restricted localities, a certain amount of lumber has been sawn from that species. Aggregating the figures for these latter two species with the cut for all other species in the province, it is seen that over the entire period spruce furnished 87 per cent of the total cut. The average annual consumption of spruce has been 52,420 cords.

SESSIONAL PAPER No. 310

TABLE VIII.—SPRUCE AND BALSAM MANUFACTURED INTO LUMBER—
ALBERTA

Expressed in Cords - 500 Bd. Ft.=1 cord

Year	Spruce	Balsam fir	Total
1913.....	83,408		83,408
1914.....	79,790		79,790
1915.....	27,982	40	28,022
1916.....	29,544		29,544
1917.....	60,282	1,768	62,050
1918.....	39,600		39,600
1919.....	40,440	402	40,842
1920.....	71,058	1,750	72,808
1921.....	46,228		46,228
1922.....	45,864	412	46,276
Total.....	524,196	4,372	528,568
Average.....	52,420	437	52,857

The pulp industry has not yet penetrated this province, nor has there ever been cut any quantity of pulpwood either for export to the United States or for use in other provinces of the Dominion. Aside from lumber production, however, there are several directions in which there has been considerable consumption of spruce. Particularly is this the case in fuelwood operations, in railway construction, in settlement improvements, and in coal mining operations. It is estimated that not less than 70,000 cords of spruce is consumed as fuel; another 10,000 cords in railway ties and construction timber; and finally, some 20,000 cords of spruce finds its way into the mines in the province. The total consumption for such uses may, therefore, be set at approximately 100,000 cords.

Summing up the foregoing figures, it would appear that the average annual consumption of spruce in the province of Alberta approximates 150,000 cords per annum. As indicated elsewhere the total available stand of the species is estimated at 26 million cords, from which quantity the supplies to fill requirements in all directions must be drawn.

SECTION 7—EXTENT OF THE LUMBER INDUSTRY

Detailed figures for lumber production from all species are to be found in Table VIIIa. For the decade covered, the peak of production occurred in 1914. Going back over the entire period through which statistics have been collected, it may be stated that the absolute peak occurred in 1911; also, 1912 was a year of relatively high production. As in the case of Saskatchewan, it appears quite clear that the lumber industry in the province has a more or less continuous growth up to 1911, continuing through 1912, 1913 and 1914, after which there was a serious falling-off. Of the later years, only in 1920 did production attain anything like the figures in the first part of the decade.

This falling off in Alberta has not, as was the case in Saskatchewan, been due to absolute cessation of manufacturing by large concerns. For years there have been mills of fair size, and such mills still continue to operate. Although certain parts of the province have been rather seriously depleted, there still remain in places considerable blocks of timber which will most certainly serve present average requirements of the industry. It is undoubtedly the case that the falling-off in lumber production of this province has been due to the invasion of Alberta markets by British Columbia timber.

14-15 GEORGE V, A. 1924

TABLE VIIIa.—ALBERTA LUMBER PRODUCTION, 1913 TO 1922 INCLUSIVE BY KINDS OF WOOD, QUANTITY CUT AND VALUE

Kinds of Wood	1913		1914		1915		1916		1917	
	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value
		\$		\$		\$		\$		\$
Spruce.....	41,704	566,250	39,895	572,100	13,991	189,304	14,772	213,668	30,141	477,254
Jack Pine.....	2,237	35,407	4,488	65,450	3,099	45,640	2,808	40,853	1,911	33,103
Douglas Fir.....	291	3,971	231	3,350	119	1,465	244	3,032	60	1,066
Tamarack.....	76	1,260	199	2,935	44	536	65	1,080	215	4,175
Poplar (Balsam).....	70	965	69	1,051	245	2,628	119	1,251	31	465
Poplar (Aspen).....	59	724	308	3,720	397	3,995	331	3,687	68	995
Birch.....	25	325	11	140	2	45	11	425		
Poplar (Cottonwood).....			35	350	58	564			242	3,647
Balsam Fir.....					20	260			884	14,822
Other kinds.....									75	1,400
Custom Sawing.....										
Maple.....										
Poplar (all kinds).....										
Totals.....	44,462	608,902	45,236	649,146	17,975	244,487	18,350	263,996	33,627	536,927

Kinds of Wood	1918		1919		1920		1921		1922	
	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value
		\$		\$		\$		\$		\$
Spruce.....	19,800	423,174	20,220	542,465	35,529	1,273,869	23,114	628,795	22,932	579,714
Jack Pine.....	986	20,522	3,200	93,497	4,092	153,622	2,523	73,999	2,338	62,294
Douglas Fir.....										
Tamarack.....	90	945	150	3,500	4	120	21	550	60	1,380
Poplar (Balsam).....	50	1,000	102	2,190						
Poplar (Aspen).....	452	7,733	85	2,550						
Birch.....									82	2,050
Poplar (Cottonwood).....	192	3,790								
Balsam Fir.....			201	5,040	875	27,000			206	4,353
Other kinds.....	14	450								
Custom Sawing.....	804	16,080	2,214	47,226						
Maple.....			1	50						
Poplar (all kinds).....					729	25,575	344	7,805		
Totals.....	22,388	473,694	26,173	696,518	41,229	1,480,186	26,002	711,149	25,618	649,791

SECTION 8—TREND OF THE PULPWOOD BUSINESS IN ALBERTA

It has already been intimated that no pulp has been manufactured in the province. On several occasions, proposals for introduction of the industry have been under consideration by various concerns. Particularly in the north country, centering more or less on Lesser Slave Lake, such proposals have been put forth, but for numerous reasons development has not materialized. While there is no doubt that, if other conditions were favourable, the timber supply of the province is sufficient to sustain at least one pulp industry of fair size, the great part of the timber is rather widely scattered, and, more important still, it is not as a general rule conveniently situated with respect to favourable power sites.

Aside from actual local development of the pulp industry, it seems highly improbable that there will for many years be any other market for pulpwood cut in this province. Remotely situated as Alberta is, the eastern pulpwood markets are entirely shut off; on the other hand, manifestly the province could hardly expect to market pulpwood in British Columbia or in the Northwestern States. In the latter province, and in neighbouring States, the timber supply so far exceeds that of Alberta, and the conditions under which it is operated are relatively so much more advantageous, that no outlet for Alberta pulpwood can reasonably be expected in that direction.

SESSIONAL PAPER No. 310

SECTION 9—SUMMARY OF SITUATION: DURATION OF SUPPLIES

Notwithstanding the fact that the timber resources of Alberta are greater than those of Saskatchewan and Manitoba, the lumbering industry never developed to very large proportions. By far the greater part of the original stand was in the Rocky Mountains, the foothills of the Rockies, and in the north country. Although the mountains and the foothills were reasonably accessible, timber had to be driven long distances by the rivers, and the latter were subject to such abnormal rise and fall, that many discouraging losses were suffered by various companies engaged in timber operations. On the other hand, it is only during the past ten years that the north country has been made accessible by railways.

In the mountains, the foothills, and the north country, however, most extensive fires have occurred. Originally the foothills and the mountain valleys contained most excellent stands of white and Engelmann spruce, with an admixture of lodgepole pine and other species. Although extensive fires occurred previous to the advent of the white man in the region, it is particularly during the course of the last forty or fifty years that the bulk of the fire damage has occurred. As is well known, Alberta is subject to frequent dry spells and to high winds, and this combination of unfavourable climatic factors has, along with wanton carelessness on the part of man, contributed to the extensive destruction of a great many billions of feet of excellent saw-timber. The same is true of the north country, where large areas, once containing magnificent stands of white spruce, were burned over, and succeeded by scrubby stands of inferior, and in some cases almost useless, species.

Over the five year period, 1918-1922, the average annual area of timber destroyed by fire was approximately 213,000 acres. Of this, 87,000 acres carried merchantable timber; 107,000 acres was young growth; and 19,000 acres, cut-over lands. The average annual loss in merchantable timber was some 437 million feet, board measure, of all species. As explained in Section 6, the average annual consumption of spruce and balsam approximates 150,000 cords. After making due allowance for other species destroyed by fire, it is at once evident that the amount of the pulpwood species burned annually exceeds greatly that actually consumed in legitimate utilization. If the area of young growth burned over be included, it is quite probable that the annual loss of spruce and balsam was somewhat over three times as great as the amount utilized. On this basis the annual drain on spruce supplies must run from 600,000 to 700,000 cords.

Although in this province, also, destructive insects are found working in the timber, epidemics have not been general, for many years at least. Perhaps greater losses have been sustained through the operations of fungi, although no intensive study of the latter has been made, and it is not possible to estimate actual losses.

Taking into consideration the stand of timber still available, it would appear that Alberta is in a better position than either Manitoba or Saskatchewan. It is quite as evident, however, that continuation of the industry, on a permanent basis, is entirely contingent upon a material reduction in the wastage due to fire. As pointed out above, depletion from this cause is greater than that through utilization; if, therefore, the losses be in large measure curtailed, the timber supplies of the province will not only permit of sustension of a forest industry of present proportions, but considerable expansion may be possible. The present difficulty in, and future danger to, establishment of the pulp industry in Alberta, lies in the seriousness of the fire losses which have already occurred, and in those which take place from time to time, as unfavourable climatic conditions are experienced.

CHAPTER IX.—BRITISH COLUMBIA

In approaching discussion of the pulpwood situation in British Columbia, we now have to deal with a province in which forest resources and forest industries, more particularly lumbering operations, are on a scale far surpassing those in any other part of the Dominion. During previous generations, when magnificent square timber was being rapidly exploited in Ontario, Quebec, and in the Maritime Provinces, the resources of British Columbia were still inaccessible, and but little known. It is to a greater extent during the past generation that the gigantic industry of the Pacific Coast has been developed. Even at the present time, exploitation is largely confined to the harvesting of a magnificent stand of timber which is the accumulation of centuries under the excellent growth conditions peculiar to the Pacific slope.

In dealing with the pulpwood resources, it must be remembered that in this province, more than anywhere else, the question of overlapping in uses, as between species, is of extreme importance,—not only because there are woods which may ultimately be used for pulp manufacture, which are not at present so used, but because they are available in such large quantities. Supplies of several softwood species are so extensive, that, even presupposing the exhaustion of species presently used for pulp manufacture, it is very far from probable that the province would face a shortage of raw materials for the industry. Whereas, in other provinces, the exhaustion of softwood species at present used in pulp manufacture, would involve reversion to the use of hardwoods of inferior fibre qualities, and presenting great difficulties under present methods of transportation,—in British Columbia, the reserve supply is of softwoods, which, although they may still present difficulties of a chemical nature in present processes of manufacture, have nevertheless the physical properties of the fibre which admirably adapt them to use for pulp manufacture; also, they possess properties which simplify their transportation by water. Moreover, with the development of more intensive and more conservative methods of logging, large quantities of material which are now wasted may be brought to use in either one of the two branches of the industry.

For the foregoing reasons it must be borne in mind that the following observations regarding pulpwood supplies relate only to species now used, and commonly considered as pulpwood on this continent; therefore, it must not be inferred that the pulpwood resources of this province are permanently limited to the amounts of the species treated with.

As stated in Chapter I, there is in this province no distinction, as between sawlogs and pulp logs, based upon size. In Eastern Canada, pulpwood invariably includes logs of smaller sizes; but in British Columbia, large logs are used for the manufacture of both lumber and pulp. Upon inspection of logs lying in the water at any British Columbia pulp mill, one would fail to determine the use for which they were intended, except by their very presence in the vicinity of a pulp mill; the kinds of logs in a boom or raft might offer some suggestion, but the size of them would not do so. Two conditions give rise to this situation; first, the presence of abundant supplies of large logs; second, in many cases logs are towed for long distances, sometimes in rough water, which prevents their being handled in the small sizes customary in eastern Canada. Except as to species, therefore (and the species consumed in pulp manufacture are by no means limited to that use) the same classes of material are used in both industries. Pulpwood in four-foot lengths was reported in this province for the first time in 1923, and this was an isolated instance of special material, cottonwood, cut in the Fraser valley for export to American mills.

It is perhaps desirable at this stage, also, to refer to the fact that in addition to the distinction of ownership, as between public and private lands, we

SESSIONAL PAPER No. 310

have both federal and provincial control of public lands. While the greater part of the area is under provincial control, the "Railway Belt," embracing a strip forty miles wide, from the summit of the Rockies westward; the "Peace River Block"; and the "Coal Lands" of the Crowsnest District,—aggregating in all, some 22,700 square miles—are controlled by the federal government. Through the ensuing pages, the province as a whole will be dealt with, and, whenever necessary, reference to federal control will be made.

SECTION 1.—TOTAL PULPWOOD RESOURCES

The province has a total land area of 353,416 square miles. Although characteristically a timber region, there is included within the provincial boundaries a large area of rocky barren and waste lands which are unproductive even of timber. The extent of agricultural lands is limited, embracing some 20,700 square miles, approximately 5.9 per cent, of the land area. The total forest, 149,334 square miles, comprises about 42.2 per cent of the land area. Of this 28,215 square miles, approximately 19 per cent, is classified as merchantable and accessible forest. It should be observed, however, that in British Columbia, while a forest tract might not be accessible under methods used in that province, it may still carry a stand of timber which might be susceptible of operation under methods used elsewhere; this accounts for the relatively small area classified as "merchantable." Notwithstanding this fact, the exceedingly rugged topographic features render inaccessible, under any known method of logging, a considerable part of the forest land which might otherwise be considered merchantable.

The total stand of spruce, hemlock, balsam, jackpine and poplar, is estimated at 295,058,000 cords. As indicated in Table I, spruce (which includes the *Sitka*, of the Coast, and *Engelmann*, of the higher altitudes) is present to the extent of 111.4 million cords; hemlock (a species entirely distinct from, and superior to, the eastern hemlock) to the amount of 101.1 million cords; balsam (in which are included species of the genus *Abies*, the more important being commonly known as "white fir") 50.86 million cords; jackpine or lodgepole pine, 28.57 million cords; and poplar, including cottonwood, 30.57 million cords. These figures, however, include large amounts both of inaccessible and scattered timber; that portion of the total stand which may be considered susceptible of commercial exploitation, now or within reasonable time, amounts to some 135 million cords.

So far, jackpine has not been used in British Columbia for the manufacture of pulp, and the use of poplar in this direction has also been exceedingly limited; as a matter of fact, cedar and Douglas fir have been used to a greater extent than has been the case with the other two. The main species used in pulp manufacture in British Columbia, however, are spruce, hemlock and balsam (white fir), more particularly the first two.

Of the 135 million cords of accessible and merchantable material of the five species, about 125 million cords cover the available spruce, hemlock and balsam. Unless and until larger quantities of other species are used, it is from this stand that supplies for the pulp mills of the province will mainly be drawn. It may here be pointed out that, although the use of Douglas fir in pulp operations has so far been confined to a comparatively small amount of kraft, it has been very successfully used in that direction. Greater development of that phase of the industry, and the use of Douglas fir therein, would bring the stand of this species amounting to over 100 million cords into consideration as potential supplies. Such a development may also bring to use large quantities of sawmill waste of this species.

SECTION 2—PULPWOOD UNDER EXCLUSIVE GOVERNMENTAL CONTROL

That part of the forest area of British Columbia which has so far not been subjected to any form of alienation, approximates 134,257 square miles,—almost 90 per cent of the total. As is the case in all provinces, however, the unalienated area cannot of itself be taken as indication of the proportion of accessible timber remaining in the Crown. Although both the federal and provincial governments still retain full title to much valuable timber, the more accessible stands have in past years been sought out by those engaged in timber operations, and secured under one form of tenure or another. That this is the case is clearly shown in Table I,—the aggregate for pulpwood species on leased and private lands being materially greater than that on the unalienated area.

Nevertheless, the total unalienated stand of the five kinds is about 126.5 million cords, of which spruce, hemlock and balsam approximate 104.85 million. Of the latter, probably less than 25 million cords may be considered accessible and merchantable. This amount, however, is not available to present pulpmills; the supposition is made that ultimately, additional mills will be constructed at advantageous points, in the interior as well as on the Coast, to take advantage of the existing supplies.

In view of the fact that both the provincial and federal governments now follow exclusively the practice of leasing or licensing timber areas, rather than disposing of them in fee simple, the question of export is thoroughly controllable under manufacturing conditions applicable to timber lands held under such forms of tenure.

SECTION 3—PULPWOOD UNDER REGULATIVE GOVERNMENTAL CONTROL

An area of some 12,077 square miles, comprising 8 per cent of the total forest area, has been disposed of under the various systems of leases and licenses applied by the federal and provincial governments. It is such lands that include the greater part of the really merchantable timber in British Columbia to-day. The total pulpwood stand of the five species is approximately 149 million cords, of which the three main kinds provide 140 million cords. Of the latter amount, probably 90 million cords may be considered as accessible and merchantable.

Legislation applying to timber lands under license and lease embraces serious restrictions as to export. On Dominion lands, it is required generally that all timber cut must be manufactured in Canada. There is a general ruling of the same character on provincial lands, but an exception is made, in that, under supervision of a log export committee, the home manufacturing requirement may be waived to permit the export of logs not marketable within the province. This subject will be dealt with more fully later; suffice it to say, here, that on all such lands, either one government or the other is in a position to fully prevent the export of unmanufactured timber if they are to do so.

SECTION 4—PULPWOOD ON PRIVATELY OWNED LANDS

The forest land which has been alienated outright amounts to about 3,000 square miles,—about 2 per cent of the total. This includes Crown grants of several classes, railway grants, and timber lands disposed of to settlers and others at various times during the history of the province. On such lands the total pulpwood stand of the five kinds is about 19.5 million cords, of which spruce, hemlock and balsam approximate 18.3 million cords. Of the latter, 12 million cords may be rated as accessible and merchantable.

SESSIONAL PAPER No. 310

Timber on privately owned land carries the privilege of export. By application of a tax on certain classes of crown grants, however,—which tax is almost entirely rebated if timber is manufactured locally—the province has, in effect, gone farther to encourage the local manufacture of privately owned timber than any other province in the Dominion. As implied above, however, this does not apply to all private timber, as there are certain classes of grants to which the tax could not legally be applied. Although there is undoubtedly a tendency to restrict by this means the export of privately owned timber, large quantities of unmanufactured logs are exported; in other words, while the method is a deterrent, it certainly has not the effect of preventing exports.

Of the 3,000 square miles of timber land in private ownership, approximately 1,350 square miles, or 45 per cent, is in the form familiarly known as “crown grants”. The balance comprises large grants to railways, and lands disposed of in small parcels to settlers and others. Of the crown grants, some 83 per cent (1,124 square miles) is held by companies and corporations, and 17 per cent (226 square miles) by individuals. It has not been feasible to determine accurately the extent to which private holdings are controlled by Canadian or foreign interests. It is apparent from records of ownership, however, that at least 37 per cent of crown granted timberland is directly under foreign control, and undoubtedly a considerable additional area stands in the name of companies which although operating under Canadian charter, are controlled by foreign capital.

SECTION 5—SUMMARY RE GOVERNMENTAL CONTROL OF EXPORTS

It has been explained that for unalienated and licensed timberlands under federal control in the Railway Belt, the privilege of export is not allowed; and that on provincial lands export is under control of the government through the aegis of the Log Export Committee. It is perhaps fitting, at this stage, that the purposes and operation of this organization should be explained.

Section 103B of the British Columbia Forest Act provides that under the authority of the Lieutenant Governor in Council, the requirements of the Act as to local manufacture of crown land timber may be waived, when the public interest demands such action. Now, in the Coast district of this province, the logging and manufacturing phases of the timber industry are to all practical purposes distinct one from the other, and, as a general rule, they are carried on by different operators; that is, to a greater extent logging is carried on as an entirely separate business, and the logs sold to the mills for manufacture. It is true that in some cases large manufacturers also carry on logging operations, but even such companies generally purchase a part of their logs; in the main, therefore, logging and manufacturing are two separate industries. Obviously, under these circumstances, there is some difficulty in maintaining equilibrium between the supply and demand for logs. If the logging interests fail to harvest an adequate supply of logs, the manufacturers are without sufficient raw materials; if the loggers exceed the requirements of the manufacturers, there becomes a surplus which reacts to the disadvantage of the logging interests, for naturally the manufacturers will not buy in excess of their requirements.

From an economic standpoint, it is essential that the mills be kept supplied with all the raw materials necessary to supply the market demands for manufactured lumber and other forest products. In other words, the conditions of the industry induce a tendency to over-production of logs. Unfortunately it is not feasible to hold over until another year a surplus of logs which may have developed during the previous season, on account of the activities of a marine borer, the teredo, which causes great damage to logs

held in salt water for more than a few months. Furthermore, the lumber industry in British Columbia has been developed largely on the basis of foreign trade. The demand of such markets is for the better grade of lumber. This in itself tends to restrict manufacture in British Columbia mills to the better grade logs. Local markets in the province cannot absorb all the products of the low grade logs; markets further east in Canada can in the main only be supplied by rail shipment, and expensive carrying charges tend to restrict such shipments to the better grades. Therefore, in addition to the accumulation of surplus logs through over-production on the part of the loggers, there is an accumulation of logs containing low grade material for which there is considerable difficulty in securing markets.

Shortly after the outbreak of the war in 1914, and due to curtailment in manufacturing operations, there was an abnormal surplus of logs. To meet the situation the provincial government, by order-in-council, waived the embargo, and to provide for control of exports, afterward established the Log Export Committee, which includes three representatives of the logging interests, three representatives from different branches of the manufacturing interests, and representatives of the provincial forest service. Any operator having logs, which he avers to be unsaleable in British Columbia, is required to substantiate his claims before this Committee. The manufacturing representatives, fully cognizant of local market requirements, may demonstrate to the committee the existence of any local demand, in which case export is not allowed; on the other hand, the loggers have the opportunity to prove their efforts at sale within the province. Upon recommendation of this committee the granting of actual permission for export rests with the government.

It is upon the basis of the arrangement just described that the province controls the exportation of logs cut from Crown lands. Details as to the amount of export so permitted will be given in the ensuing section, which deals with timber consumption in the province.

In conclusion, it may be stated, that while manufacturing restrictions on crown land timber have in many instances been waived, the Provincial Government, as well as the Federal Government, has the right at any time to prevent the export of unmanufactured timber cut from Crown lands. Computation, based upon the figures for the five species under consideration as pulpwood, indicate that the two governments may control, in this manner, over 93 per cent of the total stand in the province; and of the accessible quantities of the three main pulpwood species, spruce, hemlock and balsam, 92 per cent is fully subject to such regulation.

SECTION 6.—THE CONSUMPTION OF TIMBER IN BRITISH COLUMBIA

One of the outstanding features of the forests of British Columbia is the prevalence of softwood or coniferous species. Nowhere else in Canada is the number of softwood species so large, nor the development of individual species so great. The total stand is estimated to be 350 billion feet, board measure. Including the smaller sizes which ordinarily are not used for sawmill purposes, the total stand of spruce, hemlock and balsam is 263.4 million cords. Of this amount, as previously intimated, 125 million cords may be considered available.

Table IX indicates the amounts of pulpwood of various kinds which were consumed in the pulp mills of the province during the decade 1913 to 1922. As compared to figures for other provinces, the most noticeable feature of the table is that the consumption of hemlock is more than one-third greater than that of spruce. Together, these two have supplied nearly 88 per cent of the pulpwood used. Balsam (most of which is white fir) supplied nearly 9 per cent; while the

SESSIONAL PAPER No. 310

balance was of poplar cedar Douglas fir and miscellaneous species. The three main species therefore supplied nearly 97 per cent. Pulp manufacturing is a comparatively recent development in British Columbia and figures for the years 1913 to 1920 depict almost constant increase in consumption. In 1921 the slump, which affected the industry throughout Canada, had a similar effect in this province. The year 1922, however, showed partial recovery. It is at once evident that, although the average annual consumption of wood by the industry was 176,317 cords, this figure cannot be taken as an accurate gauge of yearly use. The average for the past five years, approximately 253,000 cords, more adequately represents the situation. Even this figure is merely of temporary use, for greater development is to be expected.

TABLE IX.—LOCAL CONSUMPTION OF WOODS FOR PULP MANUFACTURE—BRITISH COLUMBIA

CORDS

Year	Spruce	Hemlock	Balsam	Poplar	Miscellaneous	Total
1913.....	39,742	44,431	.....	.....	.....	84,173
1914.....	21,637	39,772	18,604	.....	.....	80,013
1915.....	34,526	53,009	3,000	.....	.....	90,535
1916.....	33,433	65,529	8,571	1,464	.....	108,997
1917.....	66,925	60,702	.....	363	6,824	134,814
1918.....	104,258	81,912	30,227	2,377	.....	218,774
1919.....	117,747	112,664	9,691	507	9,749	250,358
1920.....	99,772	159,513	17,777	561	17,994	295,617
1921.....	75,451	114,037	33,114	364	2,274	225,240
1922.....	70,136	155,487	35,843	454	12,729	274,649
Total.....	663,627	887,056	156,827	6,090	49,570	1,763,170

NOTE.—Included under "Miscellaneous" are the amounts of cedar, Douglas fir and other species used.

TABLE IXA.—SPRUCE, HEMLOCK AND BALSAM MANUFACTURED INTO LUMBER—BRITISH COLUMBIA

M BOARD FEET

Year	Spruce	Hemlock	Balsam	Total
1913.....	62,302	39,052	15,255	116,609
1914.....	73,712	31,116	13,701	118,529
1915.....	56,360	24,959	3,276	84,595
1916.....	49,077	28,051	1,266	78,394
1917.....	95,899	53,936	29,557	179,392
1918.....	109,944	55,111	12,172	177,227
1919.....	93,958	59,512	8,291	161,761
1920.....	132,096	87,227	11,384	230,707
1921.....	66,509	72,032	3,795	142,336
1922.....	81,696	68,016	19,876	169,588
Total.....	821,553	519,012	118,572	1,459,138

NOTE.—Complete figures for lumber production from all species will be found in Table IXE.

14-15 GEORGE V, A. 1924

TABLE IXb.—AMOUNT OF SPRUCE, HEMLOCK AND BALSAM CONSUMED IN MANUFACTURE OF LUMBER AND PULP—BRITISH COLUMBIA

Expressed in Cords

Year	Spruce	Hemlock	Balsam	Total
1913.....	164,346	122,535	30,510	317,391
1914.....	199,061	102,004	46,066	317,071
1915.....	147,246	102,927	9,552	259,725
1916.....	131,587	121,631	11,103	264,321
1917.....	258,723	168,574	59,114	486,411
1918.....	324,146	192,134	54,571	570,851
1919.....	305,663	231,688	26,273	563,624
1920.....	363,964	333,967	40,545	738,476
1921.....	268,469	258,101	40,704	567,274
1922.....	233,528	291,519	75,595	600,642
Total.....	2,306,733	1,925,080	393,973	4,625,786
Average.....	230,673	192,508	39,397	462,578

Table IXa shows the amounts of the three main pulpwood species which were manufactured into lumber. For this purpose, spruce was used to a considerably greater extent than hemlock, although the latter half of the decade shows a tendency to increased use of the latter wood; balsam, on the other hand, shows no material tendency in this direction. For all three species, the table shows increasing use. The average for the latter half of the decade, approximately 176 million feet, is materially higher than the average for the decade, and very much greater than the average for the first half.

In Table IXb will be found combined figures for consumption in lumber and pulp. Having already indicated from the previous tables that the tendency is toward increased consumption of the species in both pulp and lumber manufacture, this fact is very thoroughly substantiated in Table IXb. Whereas, the average for the decade was 462,578 cords, that for the last five years was approximately 596,200 cords. It is therefore quite clear that in considering consumption of these species the round figure of 600,000 cords may be taken as a fair average of present use.

EXPORTS

The methods under which the export of timber is permitted from provincial lands has already been described. The lack of any satisfactory means of distinction between logs for lumber and pulp manufacture, respectively, previously referred to, renders very difficult indeed, if not impossible, the tabulation of pulpwood exports from this province. True, the customs figures for ports of exit, where shipment is by rail, indicate in a measure the extent of the business in the interior, but to a much greater extent pulpwood logs cross to the United States by water, being towed in booms or rafts, and in the same tow there may be timber destined for use in both industries. It is however, well established that pulpwood so exported is confined to the three species, spruce, hemlock and balsam. Therefore, the figures for total exports of these species obviously would constitute the maximum quantity of Canadian wood which could have been used by foreign pulp mills to which British Columbia timber is accessible. The difficulty in closer determination, is, however, that all of the exports of these species are not used for this purpose.

It is nevertheless necessary to study the extent to which these exports participate in the total consumption of the pulpwood species. Accordingly, Table IXc is presented herewith, giving the exports of spruce, hemlock and balsam over the decade 1914-1923.

SESSIONAL PAPER No. 310

TABLE IXc.—EXPORTS OF SPRUCE, HEMLOCK AND BALSAM—BRITISH COLUMBIA

Expressed in Cords

Year	Spruce	Hemlock	Balsam	Total
1914.....	11,047	3,833	37	14,917
1915.....	13,489	18,300	4,313	36,102
1916.....	1,233	2,290	224	3,747
1917.....	2,133	8,184	1,596	11,913
1918.....	13	5,461	37	5,511
1919.....	831	17,721	1,499	20,051
1920.....	657	4,120	256	5,033
1921.....	9,003	18,510	1,586	29,099
1922.....	10,990	43,996	3,407	58,393
1923.....	16,509	58,253	9,841	84,603
Total.....	65,905	180,668	22,796	269,369
Average.....	6,590	18,067	2,280	26,937
Average last 5 years.....	7,598	29,520	3,318	39,436

Review of these figures indicates that, while the average annual exports for the decade have been—spruce, 6,590 cords; hemlock, 18,067 cords; and balsam, 2,280 cords; the general tendency has been toward increase. The last five years therefore offer the better basis of averages. As shown in the table these are,—spruce, 7,598 cords (19.3 per cent); hemlock, 28,520 cords (72.3 per cent); and balsam 3,318 cords (8.4 per cent). It is at once evident that the proportion of hemlock in total exports of the three species has increased materially.

It is also of interest to note the source of these exports. From the records it has been determined that 31 per cent of total exports of these species has come from crown lands, the balance being cut from private holdings. Referring now to the amounts of the individual species, 17.8 per cent of the spruce exported came from crown lands; also, 35.2 per cent of the hemlock, and 57.6 per cent of the balsam were so derived.

The much smaller actual quantities, and the lower percentage from crown lands, of spruce permitted to be exported, are explained by the fact that this wood finds a ready market in Canada. Most of it is of the species Sitka, the finest of all the spruces, very highly prized for some special lines of manufacture, and also very desirable for pulp manufacture. Hemlock, also, is used extensively in pulp and lumber manufacture in Canada, but at times when logs of the several species are plentiful, those of hemlock tend to become a drug on the market, and there consequently arises an insistent demand for export privileges. Balsam, consisting essentially of white fir, an excellent pulpwood, is inferior for lumber manufacture, and when logs of this species are not so located as to be absorbed by the local pulp mills, export privileges are sought.

While not essential to the subject of this report, it is perhaps appropriate, in order to obtain a true perspective, that mention should be made of the extent of exports of other species. For the decade, total exports of all species, for both pulp and lumber, reached nearly 836 million feet, board measure. Cedar heads the list, with upwards of 442.3 million,—well over half of the total. To a greater extent the clear cedar is manufactured in this country, being sawn into shingles and high grade lumber; and the inferior logs exported to the United States and Japan. Douglas fir logs were exported to the extent of 187.1 million feet. There then follow, in order of quantities exported, hemlock, with 122.4 million; spruce, 46.1 million; pine, 7.7 million; balsam, 4.6 million; and some 25.6 million of miscellaneous species not included in the foregoing. It is therefore apparent that nearly 80 per cent of the log exports is of species other than those used in pulp manufacture.

Another feature of the records is that, of total exports approaching 836 million feet, approximately 42.5 per cent originated on provincial crown lands. This high percentage is in a measure accounted for by heavy exports in 1915, in which year the accumulated surplus of logs was disposed of by this means. Although exports of crown land timber in 1922 and 1923 was greater than in any other year of the decade except 1915, the average annual exports of this class of timber, for the last five years, were considerably less than the average during the first half of the decade. The records also show that the ratio of crown land timber exported, to that exported from private lands, was much smaller during the last half of the decade than during the first five years; in fact, during the first five years, crown land timber comprised 74 per cent of total exports, whereas, during the last five years, they were but 26 per cent.

SUMMARY OF TOTAL CONSUMPTION

In dealing with other provinces, and before attempting summation of consumption of pulp woods, it was necessary to refer to numerous uses, other than pulp and lumber manufacture, for which the pulpwood species are consumed. This is not necessary in British Columbia, for, almost if not entirely, the wood for fuel, construction, ties and pit props is supplied from other species. Consequently, consumption of spruce, hemlock and balsam is almost entirely confined to lumber and pulp manufacture and to exports. Apparently, therefore, the total annual drain on the supplies of these species approximates 639,500 cords, which is drawn from the available supply of 125 million cords.

SECTION 7.—THE EXTENT OF THE PULP AND SAWMILL INDUSTRIES

It is not proposed to deal at length with this subject; obviously a detailed discussion of the sawmill industry would entail treatment beyond the scope of the report. It is desirable, however, that a few observations should be made in this connection, in order that the relation of wood manufacturing operations to timber supplies may be apprehended.

The pulp industry is comparatively new to the Pacific Coast, and was undoubtedly attracted there by the large supplies of cheap raw material available. As with large-scale lumbering operations, so with pulp manufacturing, particularly in the United States there has been a tendency to migrate westward. So long as the supplies of raw materials in Ontario and Quebec hold out, it is doubtful that a similar situation will arise in Canada; but, without question, if the supplies of those provinces are not conserved, the experience of our neighbours to the south will be repeated in Canada.

The figures for pulp production in Table IXd show almost constant development over the decade. As yet, the industry is confined to the Coast where supplies are more plentiful, more concentrated, and where shipping facilities are of the best. The province ranks third in pulp production, furnishing, in 1922, 9.2 per cent of the total for Canada. Groundwood constitutes over half of the pulp, and newsprint over 95 per cent of paper products manufactured in the province. Although in Ontario, the relative proportion of pulp manufactured into final paper products is much greater than is the case in British Columbia, the latter province completes the manufacturing cycle to a relatively greater extent than is the case in Quebec.

Figures for the lumber manufacturing industry are set forth in Table IXe. It may be stated that in 1908, lumber manufacture approximated 650 million feet. Rapid advance in production was then experienced, reaching a preliminary peak in 1911, with about 1,340 million. There then followed, until and including 1916, a falling-off in output, and production was relatively

SESSIONAL PAPER No. 310

low. A sharp increase occurred in 1917, in which year British Columbia finally took lead of all other provinces in lumber production. The province also led in 1914, but her position then was of a temporary character, as Ontario regained and retained the premier position through 1915 and 1916. The year 1917 seems to have been the definite turning point, however, and it seems entirely improbable that, in the occupancy of first place in lumber production, British Columbia will again be superseded. The absolute peak in production occurred in 1920, when the very large output of 1,443 million feet was attained. This was followed by a sharp decline in 1921, and partial recovery in 1922.

TABLE IXd.—PULP AND PAPER INDUSTRY—BRITISH COLUMBIA

Year	Pulp Production					Paper Production		
	Ground-wood	Sulphite, bleached	Sulphite, Un-bleached	Sulphate	Total	Newsprint	Wrapping	Total
	Tons	Tons		Tons	Tons	Tons	Tons	Tons
1913.....	38,535	22,819			61,354			
1914.....	32,692	23,660			56,352			
1915.....	41,111	24,712			65,823			
1916.....	48,313	30,342			78,655			
1917.....	65,620	43,392		2,863	111,875	76,077	2,927	79,004
1918.....	91,588	66,329		15,244	173,161	113,142	9,374	122,516
1919.....	99,767	11,518	73,369	9,472	194,126	125,904	9,406	135,310
1920.....	108,774	14,160	78,306	17,242	218,482	136,568	10,721	147,289
1921.....	89,348	17,273	51,544	6,888	165,053	92,594	5,407	98,001
1922.....	100,483	24,077	63,997	9,869	198,426	124,555	6,045	130,600
Total.....	716,231	211,254		61,578	1,323,307	668,840	43,880	712,720

In contradistinction to conditions in all other provinces except Ontario, the pulpwood species—spruce, hemlock and balsam—have in British Columbia furnished but a small part of the lumber sawn. While the tendency is toward increased use of spruce and hemlock for this purpose, in the peak year, 1920, they furnished only 15 per cent of the total lumber manufactured. Balsam (white fir) is relatively unimportant in lumber production. Far in the lead of all species, is Douglas fir, the mainstay of the lumber industry of the Pacific Coast. In British Columbia, this species occupies a position comparable to that previously held in Ontario by white pine. Although the production of Douglas fir in British Columbia has never attained a figure equal to that of spruce for all Canada, it has during the past few years been creeping upward, and possibly the time is not far distant when it will exceed the amount of spruce cut in the entire Dominion. White pine, it surpassed in production several years ago, and, although essentially confined to one province of the Dominion, while other species prevail in several, Douglas fir occupies second place in total production, with enormous cuts each year. The stand of this species is still very large, and it is not to be anticipated that even continued heavy consumption will witness substitution of Douglas fir by other species.

14-15 GEORGE V, A. 1924

TABLE IXE—BRITISH COLUMBIA LUMBER PRODUCTION 1913-1922 INCLUSIVE BY KINDS OF WOOD, QUANTITY CUT AND VALUE

Kinds of Wood	1913		1914		1915		1916		1917	
	M. Ft. B.M.	Value	M. Ft. B.M.	Value	M. Ft. B.M.	Value	M. Ft. B.M.	Value	M. Ft. B.M.	Value
		\$		\$		\$		\$		\$
Douglas Fir.....	792,852	10,895,007	601,412	6,806,650	453,415	5,332,108	574,382	8,067,168	704,352	12,490,192
Larch.....	86,062	1,182,014	59,029	685,290	28,023	362,089	36,651	575,037	45,050	811,483
Cedar.....	82,627	1,210,276	93,970	967,592	54,666	981,000	78,935	1,490,685	121,723	2,290,226
Spruce.....	62,302	960,934	73,712	887,566	56,360	766,353	49,077	719,667	95,899	1,692,657
Yellow Pine.....	58,939	874,014	34,616	463,525	35,166	457,758	92,698	1,455,396	75,102	1,726,113
Hemlock.....	39,052	549,062	31,116	342,531	24,959	285,637	28,051	392,674	53,936	1,038,986
White Pine.....	29,783	429,224	14,765	211,443	7,664	118,881	5,021	81,048	20,473	418,710
Balsam Fir.....	15,255	227,012	13,701	172,909	3,276	27,122	1,266	17,046	29,557	606,049
Jack Pine.....	4,306	61,522	7,041	88,084	4,207	56,698	7,242	102,758	1,721	31,540
Poplar (Cottonwood).....	2,381	38,069	7,149	95,728	1,110	10,948	2,336	28,240	1,825	22,925
Birch.....	62	804	22	440	50	2,000			12,365	253,355
Maple.....	26	280	54	2,101	40	800	7	79	10	200
Yellow Cypress.....			19	475	880	12,833	271	2,893	46	698
Red Alder.....			6	90					5	100
Other Kinds.....									32,781	617,131
Custom Sawing.....									5,699	108,936
Totals.....	1,173,647	16,428,218	936,612	10,724,424	669,816	8,414,227	875,937	12,932,711	1,200,544	22,109,301

Kinds of Wood	1918		1919		1920		1921		1922	
	M. Ft. B.M.	Value	M. Ft. B.M.	Value	M. Ft. B.M.	Value	M. Ft. B.M.	Value	M. Ft. B.M.	Value
		\$		\$		\$		\$		\$
Douglas Fir.....	714,018	17,299,290	817,591	22,395,242	901,915	34,412,916	680,845	16,613,882	820,724	18,778,646
Larch.....	69,768	1,745,788	112,230	308,602	49,222	1,891,524	32,992	764,122	26,374	539,641
Cedar.....	91,266	2,333,740	79,334	2,551,461	144,173	5,241,327	83,473	2,439,384	90,170	2,947,097
Spruce.....	109,944	3,044,708	93,958	2,679,746	132,096	5,185,209	66,509	1,674,355	81,696	2,023,901
Yellow Pine.....	64,706	1,424,727	37,776	1,081,287	80,578	2,899,820	40,020	1,001,493	30,708	715,405
Hemlock.....	55,111	1,338,766	59,512	1,535,745	87,227	2,911,032	72,032	1,850,168	68,016	1,576,721
White Pine.....	6,280	161,829	8,847	216,187	20,100	740,912	12,305	333,637	15,671	445,837
Balsam Fir.....	12,172	256,655	8,291	200,129	11,384	454,918	3,795	77,631	19,876	423,466
Jack Pine.....	925	19,115	11,834	332,823	13,637	557,640	2,629	66,038	4,305	112,368
Poplar (Cottonw'd).....	1,060	23,766	524	15,113	1,328	55,761	1,164	32,028	86	1,652
Birch.....	40	674	15	700	24	855	80	2,208	90	2,707
Maple.....	21	339	12	460	801	31,025	28	616	43	1,061
Yellow Cypress.....	7,114	163,266	10	400					42	1,260
Red Alder.....	5	87	7	295	35	1,220	9	207	20	360
Other Kinds.....	23,984	514,657	20,225	568,068	750	30,000			33	1,000
Custom Sawing.....	1,222	23,800	14,174	329,666	*	*	385	11,552		
Totals.....	1,157,636	28,351,207	1,164,340	32,215,924	1,443,270	54,394,069	996,266	24,867,321	1,157,854	27,571,142

SHINGLE PRODUCTION IN BRITISH COLUMBIA 1913-1922

LATH PRODUCTION OF BRITISH COLUMBIA 1913-1922

Year	Quantity M. Pcs.	Value	Year	Quantity M. Pcs.	Value
		\$			\$
1913.....	643,484	1,204,713	1913.....	108,859	163,688
1914.....	1,060,272	2,054,632	1914.....	59,140	115,024
1915.....	1,894,642	3,231,508	1915.....	46,345	78,201
1916.....	2,009,798	4,019,197	1916.....	45,729	96,900
1917.....	2,390,402	6,606,875	1917.....	42,679	116,557
1918.....	2,162,184	6,641,174	1918.....	49,741	179,041
1919.....	2,150,790	10,363,379	1919.....	45,748	203,298
1920.....	2,135,857	11,190,999	1920.....	107,224	733,119
1921.....	2,374,251	8,516,512	1921.....	104,420	716,765
1922.....	1,826,329	8,120,921	1922.....	90,459	499,240
Total.....	18,648,009	61,949,910	Total.....	700,344	2,901,833

SESSIONAL PAPER No. 310

SECTION 8—THE TREND OF PULPWOOD BUSINESS IN BRITISH COLUMBIA

Perhaps the outstanding feature of pulpwood operations in this province is the insignificant amount taken out by farmers and settlers. For the entire Dominion, 1920 Census figures showed a total farmers' production of this commodity amounting to 1,178,019 cords, practically all of which was cut in the provinces from Manitoba eastward. British Columbia farmers participated only to the extent of some 1,300 cords. The reason is readily found, however, in the absolutely different character which pulpwood operations assume in British Columbia, as compared to those of eastern Canada. Firstly, the few existing mills are not so situated as to permit of farmers participating in the supply, timber usually being available at closer range; secondly, the class of timber used is of such large size, and consequently so difficult to operate, that the business of logging entails capital expenditure and logging experience far beyond the possibilities of the average farmer; finally, the farming population within reach of the mills is so limited, that the mills could not depend upon them as an essential or regular source of supply. In eastern Canada, a farmer, with the help of his team and a few ordinary tools, may without difficulty get out a considerable quantity of wood; on the Coast, for the class of pulpwood used, many thousands of dollars must be invested in equipment before a timber area may be successfully logged.

For the foregoing reasons there has been little development in farmer pulpwood operations. Within the past year or so, however, a few small operators have commenced the cutting of four foot wood in the Fraser Valley. The district contains large quantities of cottonwood which are an obstruction to cultivation. A market for this material having developed in the neighbouring State of Washington, a number of farmers are taking advantage of it, and through the medium of brokers are disposing of quantities, so far not exceeding nine or ten thousand cords in all.

So long as pulp manufacture is confined to the Coast, and pulpwood operations to the heavy stands which prevail there, the cutting of pulpwood by farmers must remain of small proportions. With the establishment of mills in the interior, however, operating in lighter stands of timber, and using smaller wood, it is altogether probable that the farmer with wood to dispose of may find a market for it. Until then, the business cannot develop except for what opportunities may offer through export to neighbouring states. In the Nelson and Cranbrook districts of southern British Columbia small quantities of pulpwood, aggregating possibly 11,000 or 12,000 cords, are cut and exported,—to a greater extent by those engaged in pole and tie operations, however, rather than by farmers.

Records for the six year period 1917 to 1922 show that the pulp mills of British Columbia purchased over 39 per cent of the pulpwood required for their operations. Notwithstanding the segregation of logging and manufacturing, in two distinct industries, the investments in a pulp mill are so heavy, that it is necessary to protect the wood requirements by the acquirement of timber lands. From such lands, the mills have secured the balance of the wood required for their purposes. As previously inferred, the purchased wood is secured from loggers, either in the open market or by contract. Frequently, also, limits held by a pulp company are operated under contract with logging companies.

From the standpoint of exports, it is difficult to anticipate future developments. It has already been shown that over the decade there have been considerable exports of pulpwood species, but these in no manner approach the large quantities exported from individual provinces in the east. There is statutory authority for continuing exports of provincial crown land timber, under special permit, until 1930, in which year further amendment to the Forest Act would be required if the practice is to continue.

It is also impossible to gauge probable future progress of the pulp and paper industry. For several years past, developments have been expected both in the southern and the northern interior, but as yet no mills have been established. The abundance of raw materials, however, and the interest from time to time displayed in the possibilities of different sites, may surely be taken to augur that the industry is destined for material expansion in British Columbia.

SECTION 9—SUMMARY OF SITUATION: DURATION OF SUPPLIES

From figures presented in discussion of the pulpwood resources of the province, it is evident that the supplies available are quite adequate to sustain all forms of industry as developed up to the present time. Indeed, there is manifestly room for material expansion whenever market conditions may justify such action. Having frankly conceded apparent adequacy in supplies, however, it is necessary to allude to certain factors which may militate against development of the timber industry to the extent predestined by the rather bounteous provisions of nature.

Although she is now successfully competing in world markets, British Columbia is rather isolated, topographically, from the rest of the Dominion. The Rocky Mountain system offers a barrier to transportation by rail which can be surmounted only by the payment of expensive rail charges. Looking in other directions, and with the exception of neighbouring states, the province is separated from the rest of the world by the Pacific. On both sides, she is confronted with transportation charges upon her products which have in some manner to be overcome. Had these transportation difficulties not existed, however, there is at least some doubt that industries would have been developed to the degree in which they now exist; the very isolation of British Columbia resources—if they were to be brought under exploitation—necessitated the influx of capital in order that the handicap of excessive transportation charges might be reduced to the lowest possible minimum, namely, by the local manufacture of raw materials. The one thing which has served to attract the very necessary capital has been the abundance and general high quality of British Columbia timber; a coniferous forest, equalled nowhere in the world except in the adjoining States, offered the incentive to outside capital, and by large-scale production of high class products, the handicaps of distance have in a measure been overcome.

It is rather evident that prosperity of the timber industry, and of the province, is, in the first place, largely dependent upon the maintenance of the advantage she now holds by virtue of abundant supplies of high grade material; secondly, upon the home manufacture of raw materials. Even with the exhaustion of present remarkable stands of timber, the province enjoys an additional advantage in the almost ideal conditions for the rapid growth of timber. All of these advantages, however, are such that, if they are to continue in their beneficial effect, they must be given adequate protection.

Remove, for the moment, from British Columbia, the huge timber; remove, the excellent growth conditions which obtain,—and British Columbia would stand precisely in the position of many other timber depleted countries or regions, *plus* transportation charges which would render impossible her competing with the outside world. If this be true in the extreme hypothesis, it is proportionately so in less extreme application; conversely, everything which can be done to protect and conserve the remnants of the centuries-old timber stand, and everything which may be done to encourage and protect the remarkable powers of reproduction and growth which the species and the climate of the province induce, will abundantly contribute to the ability of industry to overcome all of the disadvantages of high transportation costs which her products must inevitably bear.

SESSIONAL PAPER No. 310

So far as pulpwood species are concerned, the division of total available stand by the amount of annual consumption would indicate supplies, on the present scale of production, for a period of 195 years.

By reason of the complex nature of the forest, and in the lack of facts regarding growth it is difficult to estimate the annual growth in pulpwood species. For the whole forest area, however, a rough estimate of the balance between annual increment and depletion by fire and other losses was published by the Forest Branch of the Province in 1923. This estimate is admittedly based upon entirely inadequate data, and must therefore be accepted in that light. On the entire forest area gross annual increment is set at 796,500,000 cubic feet. Against this, the losses by fire, decay, waste, etc., are set at 352,000,000 cubic feet; leaving a net annual increment of 444,500,000 cubic feet. At the same time, the figure for total annual consumption of wood for all purposes, being the average for 1920, 1921 and 1922, is about 2,140 million feet, board measure, which is equivalent to approximately 468 million cubic feet of standing timber.

The foregoing figures would indicate that the aggregate of consumption, and depletion by other factors, is fairly close to the amount of annual growth. It may be pointed out that to a great extent the annual cut is made in fully matured stands where there is no increment previous to cutting; and where, after cutting, there may be material increase in increment. They illustrate nevertheless that in this one province, there probably is not a negative balance, as between gross depletion and gross annual growth; which condition prevails elsewhere throughout the Dominion.

It will be perceived that, under such conditions, whatever may be saved by the prevention of annual losses through fire, etc., will increase so much the amount of timber which might be used without disturbing the wood capital. In fact, it has been estimated that, if adequate fire protection be provided, the forests of the province can, under conservative exploitation, supply several times the present annual cut without seriously depleting the capital stock. The amount and effect of such losses are greatly increased by some of the more destructive and wasteful features of present-day methods of exploitation. So far as fire is concerned, and particularly on the Coast, the average menace is not unusually great. Other parts of the province do present fire problems of great difficulty, however.

The problem, therefore, which faces the province to-day, is not one of curtailment in production,—with the supplies available, such action would constitute hoarding, when the world demands timber; rather, the problem lies in the development toward increased use, but along lines and under methods which will insure perpetuation of the stand. The maintenance of advantage which the province enjoys in quantity, quality, and growth of timber—so essential to the overcoming of other disadvantages with which the industry is beset—demands the more careful and more complete use of timber which is harvested, and the protection of it, and of the young timber stands, from fire.

CHAPTER X—CANADA*

In the foregoing chapters the situation in the individual provinces has been discussed in some detail; and we are now in a position to deal in a practical manner with the question as it affects the Dominion as a whole.

From the data presented, it will be perceived that the country may be divided into four main regions, based upon the degree to which supplies are available and the extent to which the pulp industry has been developed:—(a) the Maritime Provinces, where the supplies available are very limited, and where the industry has not been developed to large proportions; (b) Quebec and Ontario, where supplies appear to be much more extensive, but where, also, the industry has developed to enormous proportions,—almost, it might be said, to

* Prince Edward Island, the Yukon, and the Territories are not included.

the maximum which will permit of permanence; (c) the Prairies, where supplies of spruce and balsam are not great, and where the industry has not yet become established; and (d) British Columbia, where abundant supplies are available, and where the industry, although certainly well established, has not nearly reached the maximum which the wood supplies make possible. This is, to be sure, rather arbitrary division, for except in the case of British Columbia there is perhaps a little liability to overlapping between regions; not so much, however, as might at first glance appear. The Prairies might to a limited extent serve to augment Ontario supplies, but the impending introduction of the industry to Manitoba renders this improbable. Obviously, the Maritime Provinces cannot supply Quebec or Ontario to any material extent; the reverse is more liable to be the case, and indeed, Quebec is already shipping some logs to New Brunswick. In the ensuing discussion, therefore, these broad regions will be kept in mind.

SECTION 1—DISTRIBUTION AND OWNERSHIP OF PULPWOOD RESOURCES

It is necessary to state here that, in summation of pulpwood resources, only the main species are dealt with. It has been clearly explained that the introduction of other species to extensive use in the industry would of itself greatly increase the supplies available; particularly is this the case in British Columbia.

The total land area of that portion of the Dominion under review is 2,174,520 square miles; of which 1,216,408 square miles, about 56 per cent, is forest. For comparative purposes it may be of interest to note here that the agricultural area amounts to 428,893 square miles, not quite 20 per cent of the land area. Of the whole forest area, a little better than 36 per cent is considered to be merchantable forest, the balance being either entirely inaccessible or too sparsely timbered to permit of successful operation now or within any reasonable time.

The total available stand of pulpwood species is estimated at 630 million cords, of which amount 436.2 million cords is spruce, balsam and hemlock. By regions and by ownership, the supplies are distributed approximately as indicated in Table X.

TABLE X—DISTRIBUTION AND OWNERSHIP OF AVAILABLE PULPWOOD—CANADA*

Millions of cords

Region	Entirely unalien- ated	Licensed or leased	Privately owned	Total
Maritime Provinces.....	0.30	15.70	30.60	46.60
Quebec and Ontario.....	56.50	132.00	27.00	215.50
Prairie Provinces.....	40.35	5.50	3.25	49.10**
British Columbia.....	24.00	90.00	11.00	125.00
Total.....	121.15 27.8%	243.20 55.7%	71.85 16.5%	436.20 100%

*Prince Edward Island, the Yukon, and the Territories not included.

**Available only if the pulp industry becomes established locally.

Of the total quantity available 27.8 per cent still remains entirely in the Crown; 55.7 per cent has been leased or licensed, practically all of it under terms which permit the application of domestic manufacturing requirements. Of both licensed and unalienated timber almost 83 per cent may be subjected to

SESSIONAL PAPER No. 310

such restrictions if the respective governments so desire; most of it is already so restricted. The remaining 16.5 per cent is privately owned, and no restrictions in export have been applied, except in British Columbia where certain taxes, referred to in Chapter IX, have a tendency in that direction. It is perhaps well to point out that if *total* resources of the five species are taken, having no regard to the question of accessibility, the approximate percentage of unalienated timber is 61 per cent; licensed or leased, 31 per cent; and privately owned 8 per cent. The great difference between these percentages and their respective counterparts above, indicates clearly the extent to which the resources have been disposed of either under license or in fee simple.

To obviate possible misunderstanding of the general timber situation, it is advisable to emphasize that although Quebec and Ontario show a large stand of the pulpwood, as compared to British Columbia, it must not be inferred that the former provinces have a total timber stand in any way comparable to that in British Columbia. A mere glance at the saw timber figures in Table I will immediately remove any misapprehension in that direction; including both hardwoods and softwoods British Columbia has over 70 per cent of the merchantable saw timber in Canada to-day. So far as species at present utilized for pulp manufacture are concerned, however, the eastern provinces have the greater stand of pulpwood.

Very prominently featured in Table X is the great extent to which timber has been completely alienated in the Maritime Provinces; notwithstanding the relatively small amount of timber which they possess, they account for over 42 per cent of all the privately owned pulpwood in the Dominion, Nova Scotia exhibiting this feature to a greater extent than New Brunswick. Equally startling is the relatively insignificant reserve of unalienated timber held by the Maritime Provinces, as compared to the fair proportions in full control of the governments in other provinces.

As is the case in many industrial activities in Canada, foreign capital enters very strongly into the control of forest industries in many parts of the Dominion; particularly is this the case with large scale operations such as the pulp mill and sawmill properties. In the main, however, these industries are conducted by companies operating under Canadian charter.

So far as timber holdings are concerned, our main interest is to determine to what extent foreign control may tend to encourage exports of unmanufactured wood. It is already thoroughly established that unalienated and licensed timber, is in large measure, under restriction for exports, and we may therefore confine discussion to privately owned timber. Unfortunately no complete or accurate figures can be presented, but it has been determined that approximately 30 per cent of private holdings is directly controlled by foreign companies, corporations and individuals. This figure applies to areas, but for the purpose of very general conclusion it is permissible to apply it to timber quantities; on this basis it may be stated that some 21.5 million cords, or about one-half of one per cent, of the available pulpwood timber falls in this category. It is not to be hastily concluded that all of this timber is held exclusively for export purposes; a certain part of it is, and for the balance the general tendency is undoubtedly toward export. Such holdings are centered largely in the Maritime Provinces, in Quebec, and in British Columbia.

SECTION 2—REQUIREMENTS FOR MANUFACTURE IN CANADA

To summarize the situation throughout the Dominion, it may be stated that under legislation extant the available pulpwood of Canada is subject to restrictions, or available for export, as indicated in Table Xa.

14-15 GEORGE V, A. 1924

TABLE X_A—LOCAL MANUFACTURING RESTRICTIONS VS. EXPORT PRIVILEGES—CANADA*Millions of cords*

Region	Manu- facturing restrictions	Export privileges	Total
Maritime Provinces.....	12.90	33.70	46.60
Quebec and Ontario.....	188.50	27.00	215.50
Prairie Provinces.....	45.85	3.25	49.10
British Columbia.....	114.00*	11.00**	125.00
Total.....	361.25 82.8%	74.95 17.2%	436.20 100%

*Under conditions described in Chapter IX, a certain amount of provincial Crown land timber is allowed to be exported under special permits.

**As described in Chapter IX, limited restriction is placed on some classes of privately owned timber; not, however, to a degree which prevents export.

SECTION 3.—DOMINION CONSUMPTION OF PULPWOOD

In treatment of the matter by individual provinces, in Chapters II to IX, a good idea has been given of the extent to which the pulpwood resources are called upon to supply the annual requirements of Canadian industries. In this instance there is nothing to be gained in a summing up by regions; of greater importance is a discussion of total consumption for the Dominion. Table X_b gives figures for pulpwood consumption of the various species for the decade 1913 to 1922.

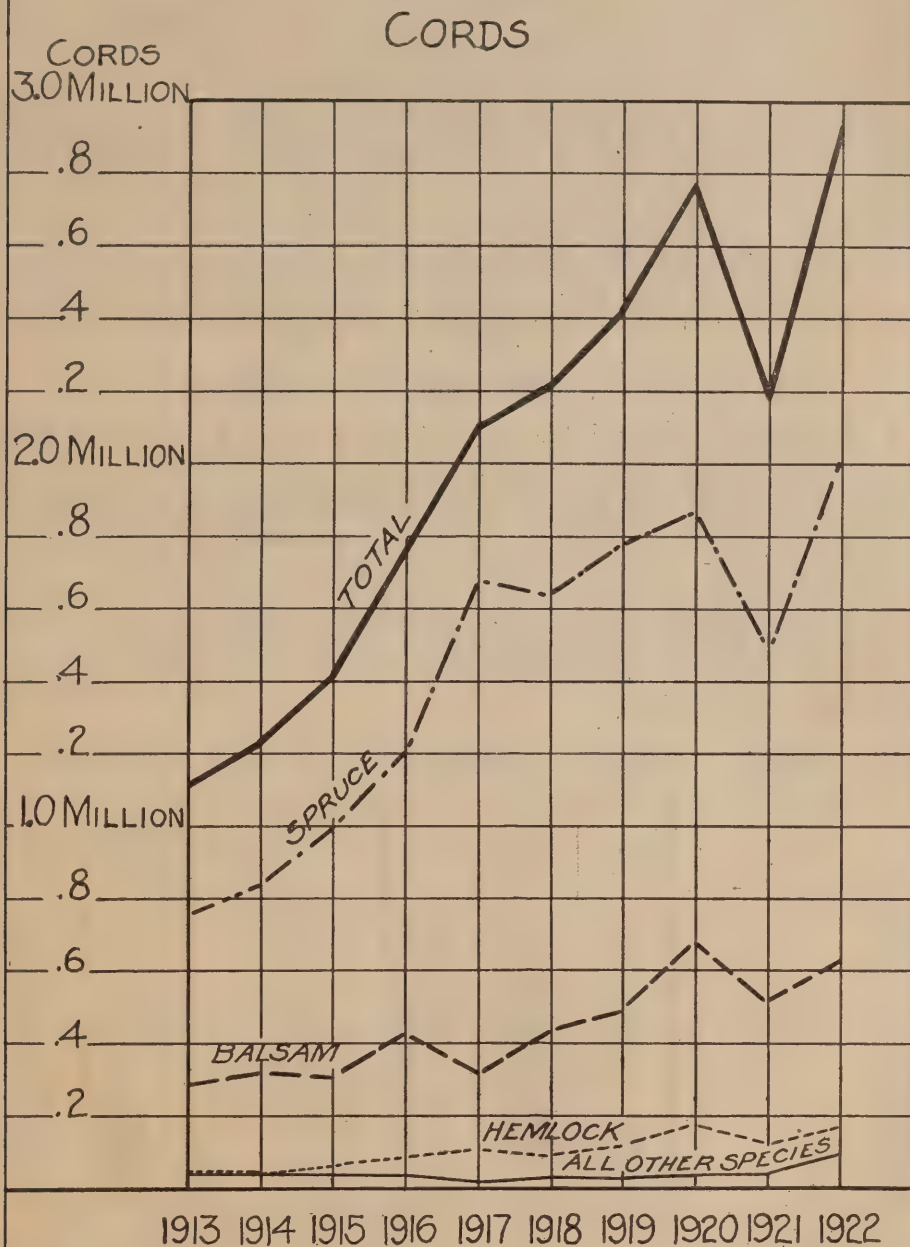
TABLE X_B—WOOD CONSUMED IN CANADIAN PULPMILLS, 1913-1922*Cords*

Year	Spruce	Balsam	Hemlock	Jack Pine	Poplar	All Others	Total
1913.....	754,858	283,292	47,360	19,383	4,141	.....	1,109,034
1914.....	836,387	314,183	45,246	24,715	3,845	.....	1,224,376
1915.....	998,156	307,219	55,265	41,953	3,243	.....	1,405,836
1916.....	1,203,557	433,154	82,307	39,717	6,177	.....	1,764,912
1917.....	1,678,656	309,515	101,321	2,850	5,168	6,824	2,104,334
1918.....	1,638,733	447,243	89,007	25,851	9,885	25	2,210,744
1919.....	1,787,868	490,327	118,013	15,402	7,228	9,868	2,428,706
1920.....	1,873,024	687,519	176,029	15,743	5,732	19,375	2,777,422
1921.....	1,499,478	511,791	122,997	40,406	3,557	2,349	2,180,578
1922.....	2,032,985	627,626	157,947	79,461	1,305	13,248	2,912,608
Total.....	14,303,702 71.12%	4,411,869 21.93%	995,492 4.93%	305,481 1.52%	50,281 0.25%	51,725 0.25%	20,118,550 100%

In Figure 1, there is shown graphically the total consumption of wood by the pulp mills of Canada from 1913 to 1922, based upon the figures of Table X_b. In the same chart are included consumption graphs for spruce, balsam, hemlock, and for other species. If figures previously presented have by any chance failed of conviction as to the important part which spruce plays in supplying raw materials for the industry, the spruce curve in Figure 1 will surely do so. The relative importance of spruce and balsam, in this regard, is also clearly depicted. The amounts indicated by individual curve for hemlock, and figures for the same species in Table X_b, are due almost entirely to the extensive use of the western species for this purpose in British Columbia. Finally, prominently displayed is the insignificant extent to which all other species—jackpine, poplar,

FIGURE 1.

WOOD CONSUMED IN CANADIAN PULP MILLS. 1913-1922



Douglas fir, cedar, etc.—contribute supplies for the pulp industry; the amounts of the latter species are so small that they cannot be plotted individually on the scale of the chart.

It is obvious that, aside from British Columbia where considerable amounts of hemlock are used, the proportion of spruce used in the Dominion would be at least 75 per cent of the total; actually, however, it is 71 per cent. Balsam (including white fir of the Pacific Coast) is also important, closely approaching 22 per cent. Generally for Canada, therefore, these two are manifestly the main species, providing over 93 per cent of all pulpwood supplies.

As explained in previous chapters, spruce and balsam, are also used to a greater or lesser extent in the manufacture of lumber, and consumption in the latter industry has therefore a very important bearing upon depletion in the stand of pulp woods. The primary graph of Figure 2 shows the combined total consumption of spruce and balsam in the pulp and lumber industries; other graphs show combined consumption for each of the two species. For hemlock no graph is included in Figure 2, as British Columbia is the only province in which it enters materially into consumption of both industries,—in the eastern provinces its use is almost entirely confined to lumber manufacture.

SECTION 4.—EXPORTS OF PULPWOOD

As previously explained, the only statistics available for pulpwood exports are secured from the returns of customs collectors at the various ports of exit. For the whole of Canada, these figures may be accurate, as far as they go, but, owing to a considerable amount of interprovincial traffic in pulpwood, such returns do not correctly indicate the amounts of wood originating in each province and exported from Canada; also, in British Columbia there is no distinction between saw-logs and pulp logs, so far as water shipments are concerned, and hence, the figures for the considerable quantities of wood destined for American pulp mills, shipped from that province by water, do not appear in customs returns as pulpwood exports. The official export figures are, however, shown in Table Xc.

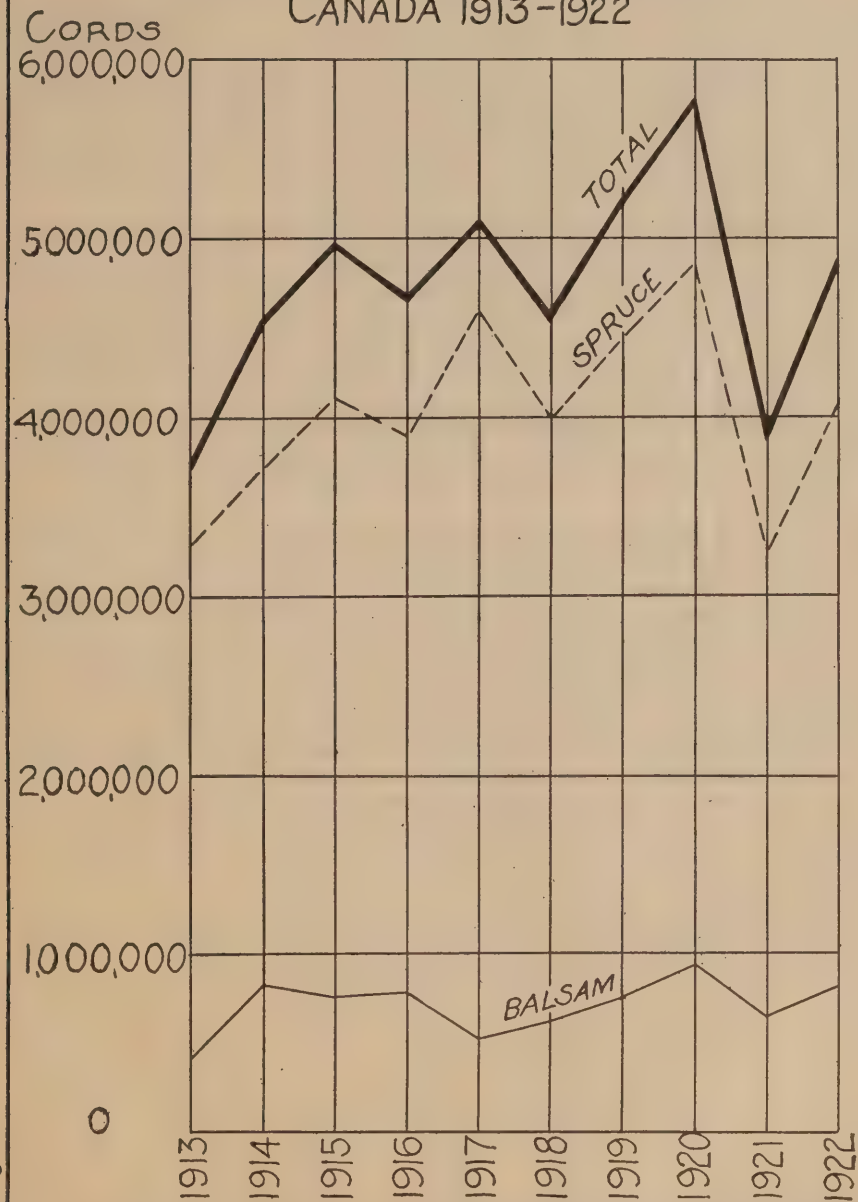
TABLE Xc—EXPORTS OF PULPWOOD FROM CANADA, BY PROVINCES

Year	Nova Scotia	New Brunswick	Quebec	Ontario	Prairies	British Columbia	Canada
1908.....	1,630	84,809	683,703	72,166			842,308
1909.....	5,842	86,599	737,877	105,306			935,624
1910.....		89,628	742,933	110,590			943,141
1911.....	55	122,698	636,136	89,050			847,939
1912.....	5,773	150,901	751,815	72,379			980,868
1913.....	6,049	141,553	802,260	84,699		69	1,035,030
1914.....	1,557	143,787	687,421	139,743			972,508
1915.....	3,310	119,896	624,269	202,239			949,714
1916.....	3,735	127,730	786,879	149,745		118	1,068,207
1917.....	770	156,255	698,839	161,652		329	1,017,845
1918.....		263,907	885,772	199,421		436	1,349,536
1919.....	15,712	195,354	661,414	196,041		1,754	1,070,275
1920.....	27,211	185,637	827,982	202,171	65	4,338	1,247,404
1921.....	29,800	215,266	601,846	239,264	347	8,030	1,092,553
1922.....	34,650	144,639	553,836	269,419	16	8,772	1,011,332
1923.....	11,451	173,828	760,328	414,288	80	24,255	1,384,230

Figure 3, based on the figures of Table Xc, includes graphs for the Dominion total exports, and for exports from individual provinces where the figures are of sufficient size to permit of plotting.

FIGURE 2.

CONSUMPTION OF SPRUCE & BALSAM
IN
PULP & SAWMILL INDUSTRIES
CANADA 1913-1922

*Royal Commission on Pulpwood*

While Figure 3 is of general interest, and particularly for eastern Canada gives an excellent idea as to the relative positions of the individual provinces in exports, it has been considered desirable to construct a chart which will show in an empirical manner the extent to which unmanufactured wood, of the main pulp species, whether actually used for pulp or not, has been exported. In Figure 4, therefore, adjustment of both individual and total figures has been made, firstly, to compensate as between provinces for wood transhipped (possible only for the last couple of years); secondly, to include the spruce, balsam and hemlock exported from British Columbia. The graphs of Figure 4 may therefore be taken to represent with greater accuracy the actual situation regarding export of pulp woods.

A study of Figures 3 and 4 accentuates the fact that the province of Quebec is by a large margin the source of the greater part of pulpwood exported from the Dominion; assuredly this province has been the 'barometer' of the pulpwood export business, so closely do the graphs for that province and for the Dominion synchronize in their general trend. Over the entire period Quebec furnished approximately 68.3 per cent of total exports.

Another thing, clearly illustrated,—although pulpwood exports have not increased quite so rapidly as in the public mind they are believed to have done, there nevertheless has been a very decided upward trend; even in the last decade, the curve, if mathematically averaged, would show pronounced proclivity upwards. For this feature of the situation, Quebec is perhaps not so responsible as are the other provinces combined; on four previous occasions, the former showed exports in excess of those for 1923; while the graphs for Ontario, New Brunswick, British Columbia and Nova Scotia show decided tendency toward increased exports; the latter provinces have contributed in greater measure, therefore, toward the forcing upward of the exports for the whole Dominion.

Before leaving the general question of exports, it is desirable that reference be made to the relation between domestic consumption and exports of pulpwood. The situation in this regard is plainly perceived by examination of Figure 5: Prior to 1913 exports exceeded the amount used in Canadian mills, but in that year the cordage locally consumed overtook the quantity exported; and the gap between them has almost constantly increased since that time. There has therefore been a continuous decrease in the ratio of exports to total pulpwood production, until in 1922, the last year for which total production figures are available, exports approximated roughly one-quarter of total production. In view of the fact that larger quantities of wood were most certainly available for export, the demand for our wood in American markets has by no means kept pace with the demand in this country,—thus illustrating more rapid development of the pulp industry in Canada, as compared to that in United States.

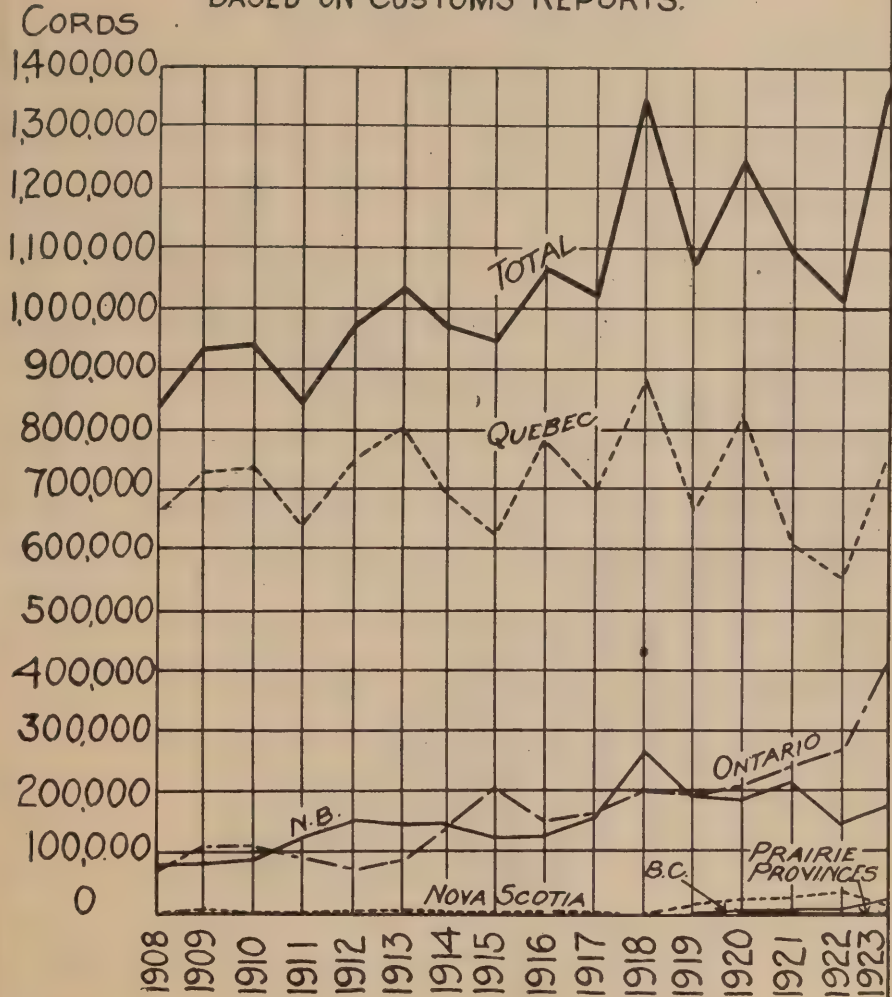
Although exports of pulpwood from Canada to the United States—reported as such through the Canadian Customs—consist almost wholly of spruce, balsam and poplar, the respective amounts of these species cannot be determined from export returns. By using United States figures for pulpwood imports and consumption, however, it has been possible to come to reasonably definite conclusions regarding the amounts of the three species exported from Canada, and also as to the regions in which they are primarily used. By this means it has been determined that, of the Canadian pulpwood exports in the six year period 1917-1922, spruce comprised approximately 68 per cent of the whole; balsam, about 20 per cent; poplar about 12 per cent. These figures, therefore, give an excellent indication as to the classes of wood, and the degree to which they have participated in exports. Apparently in 1923 considerably greater interest has been evinced in poplar exports; and it seems probable that from now on the percentage of this species will be greater than heretofore.

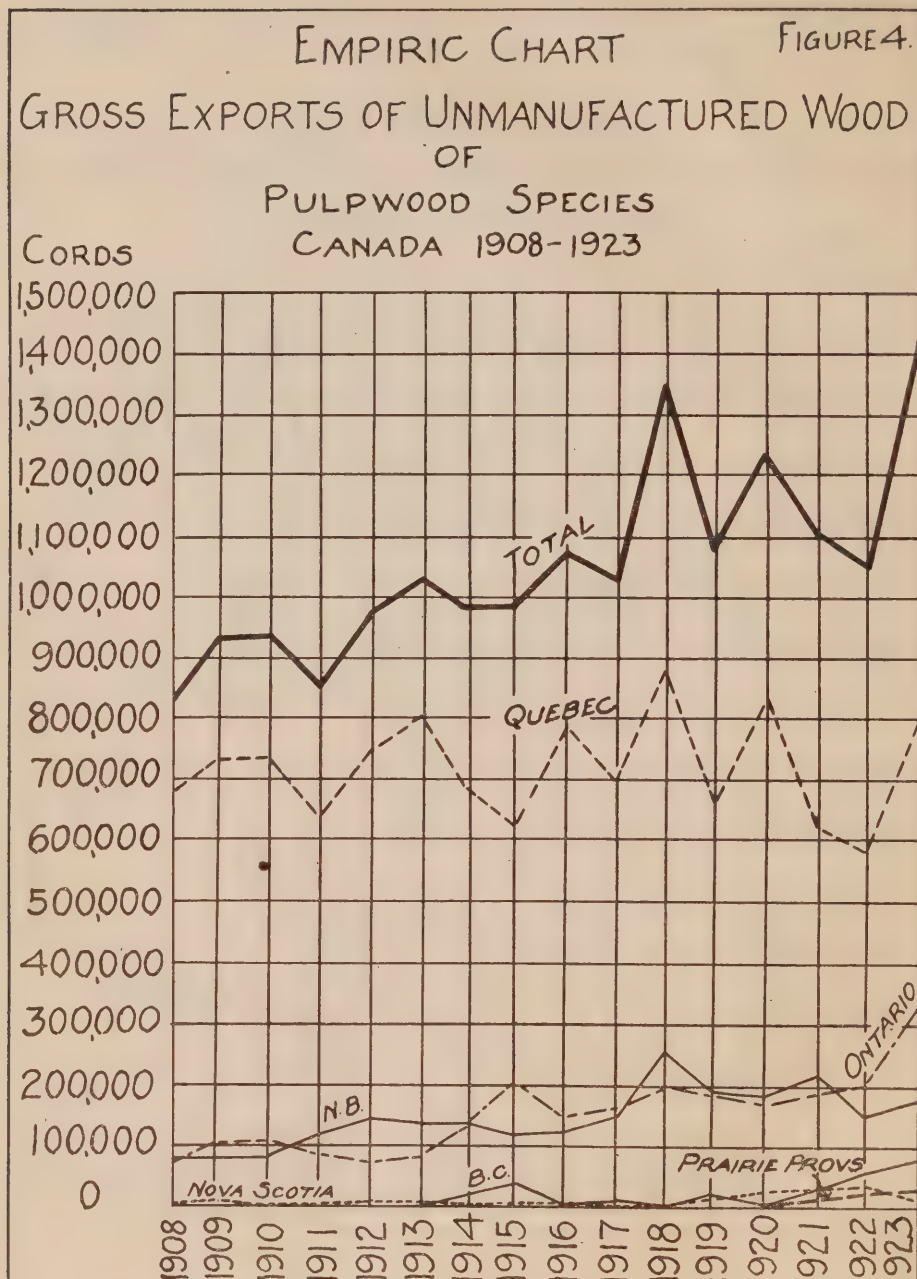
EXPORTS OF PULPWOOD

FIGURE 3.

CANADA 1908-1923

TOTAL EXPORTS FOR THE DOMINION & INDIVIDUAL PROVINCES
BASED ON CUSTOMS REPORTS.

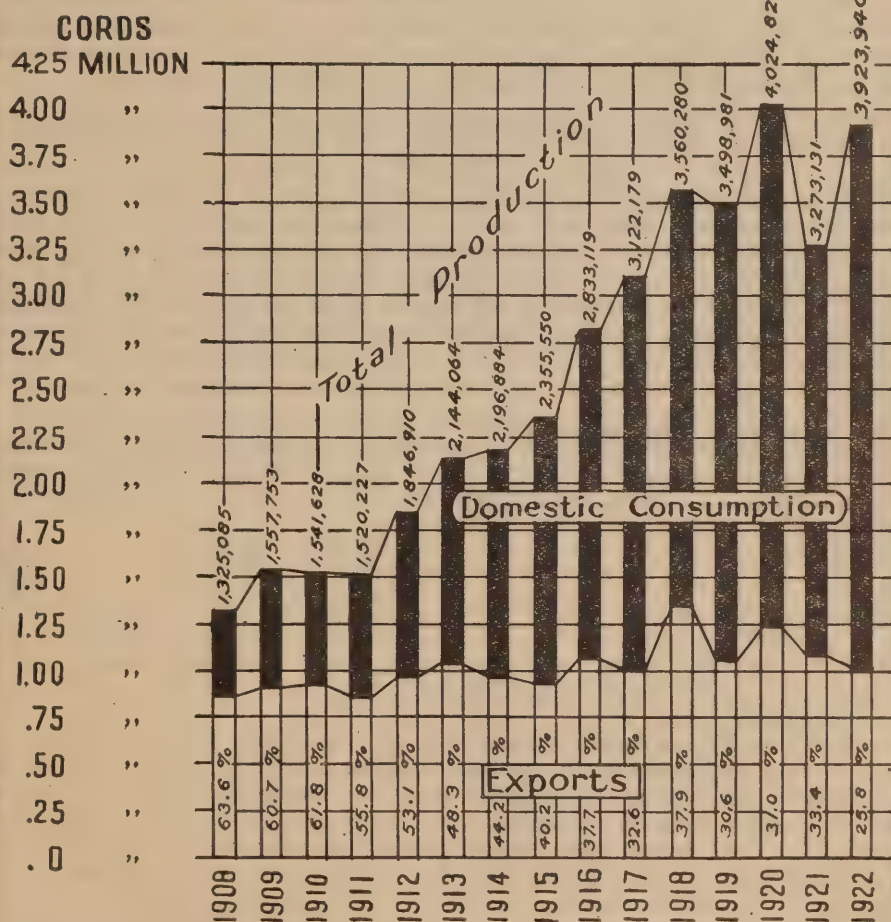




Note: The figures, upon which the above graphs are based, include all log exports of Spruce, Balsam and Hemlock in British Columbia; adjustments have also been made to compensate for interprovincial traffic in pulpwood. A better idea of actual exports of pulp woods is secured from this chart than from Fig. 3.

Figure No. 5.

PULPWOOD UTILIZATION IN DOMESTIC CONSUMPTION & EXPORTS CANADA: 1908-1922 CORDS



NOTE: For exports, the percentage of total production is inserted in the unshaded portions of the bars. B.C. log exports are not included.

Aside from log exports in British Columbia—most of which is consumed by mills in the neighbouring state of Washington—about 90 per cent of Canada's spruce export is consumed in New York, Maine, Pennsylvania and New Hampshire,—about one-half of it being used in New York State alone. The only other States participating to any extent in the use of imported spruce are Michigan, Wisconsin, Massachusetts and Vermont. As for poplar, with the exception of relatively small amounts of cottonwood shipped from British Columbia to Washington State, over 99 per cent. of Canada's total exports of this species are consumed in New York, Maine, and Pennsylvania. For balsam, similar figures cannot be given; it may be assumed, however, that the use of exports of this species is practically on the same basis as spruce,—if anything, a higher proportion being used in New York, Maine, Pennsylvania and New Hampshire,—owing to the higher percentage of this species in the forests of Quebec and New Brunswick—and a correspondingly lower percentage in Michigan and Wisconsin.

While it is impossible to present accurate figures as to the extent to which farmers' wood participates in total exports, a review of the situation throughout the Dominion indicates that the percentage of farmers' wood probably runs between 60 and 65 per cent of the total amount of pulpwood exported.

SECTION 5—TOTAL CONSUMPTION OF THE MAIN PULPWOOD SPECIES

In sections 3 and 4, the utilization of pulp woods for home manufacture and for export have been dealt with. In discussion pertaining to the various provinces, it has been shown that extensive use is made of these woods in other directions: fuel, railway ties, mine timber, construction timber, etc., all enter into consumption, and exact their toll on the pulpwood resources of the country. Unfortunately annual statistics are not available for all such products, but definite conclusions have been reached in this connection, and it now remains to explain in general terms the total demand upon the pulpwood resources.

TABLE Xd—ANNUAL UTILIZATION OF MAIN PULPWOOD SPECIES

Province	Spruce	Balsam	Hemlock*	Total
Nova Scotia.....	330,000	70,000	.....	400,000
New Brunswick.....	900,000	200,000	.....	1,100,000
Quebec.....	2,300,000	700,000	.....	3,000,000
Ontario.....	1,116,000	84,000	.....	1,200,000
Prairies.....	570,000	.....	.....	570,000
British Columbia.....	320,000	51,200	268,800*	640,000
Total.....	5,536,000	1,105,200	268,800*	6,910,000

*British Columbia only.

In Table Xd are figures representing what may be considered as the minimum annual requirements of the main pulpwood species. In some cases they are based upon average consumption over the decade 1913-1922, but in other instances where such an average was not truly indicative of actual use in the latter half of the decade, the average for the later years was taken. By "minimum requirements" is meant use on the same basis as that of the present time. Obviously, in certain provinces, more particularly, Quebec, Ontario and British Columbia, anticipated expansion of the industry will involve greater consumption. However, such increase may in part be offset by curtailment in lumbering operations, more particularly in Ontario and Quebec. On the other hand, with a continuance of present conditions, some increase might be expected in pulpwood exports. Under these circumstances there seems to be little doubt that the consumption of these pulp wood species may in the near future run between 7 and 7½ million cords per year.

SECTION 6—THE EXTENT OF FOREST INDUSTRY IN CANADA.

Just how much the forest has meant, and still means, in the development of this country is but meagrely appreciated by the public in Canada. In the early days, it was undoubtedly the large profits of the fur trade that attracted attention to the possibilities of this country, and gave rise to the first settlements. Later, however, as settlement increased, and became more stable, the population settled down to two main pursuits,—agriculture and timber production.

In many instances the presence of the forest was considered as an obstruction to agricultural development, and magnificent stands of timber were ruthlessly swept out of existence by the use of fire and axe, with little or no financial return from the timber cut. In other instances, however, although timber offered obstruction to agriculture, its value was more truly appreciated, and it was made to not only pay the costs of clearing, but its operation was the means of furnishing the early settler with much needed cash at a time when he was too remote from markets for agricultural produce to reap any money return therefrom.

Many a thriving agricultural community to-day owes its original success to the fact that its pioneers, besides adding yearly to the area of soil under cultivation, spent a considerable period of their time working in the lumber camps and the mills, securing therefor immediate cash returns for the labour they gave,—ready money, so necessary to general development of communities situated beyond the limits of participation in trade in the general agricultural markets. Nor has the day yet gone, when the settler, literally hewing out a farm and a home for himself and his family, takes advantage of the employment offered in the logging camp, the sawmill, the pulpmill, or other forest industries, and in this manner augments his cash income, and thereby sustains himself on the land until the latter is brought to that state where it is sufficient to the complete sustenance of his family.

In earlier days the profit in forest activities lay in the production of square timber, but very rapidly there developed industries for the manufacture of the raw wood into various products. To-day, the ramifications of Canadian industry based upon the use of wood as a raw product, are myriad. Nowhere in the Dominion is a home built, a town constructed, or almost any other process known to modern industry and development pursued, but some product of the wood-using industry is brought into play.

Leaving out of consideration, for the moment, the production in wood manufacturing, the total value of primary wood products—i.e. fuel, ties, logs, pulpwood, square timber, etc., but including neither manufactured lumber nor pulp—produced in 1920, was approximately 212 million dollars. That year, however, was a peak in production and also in value of the products. On the other hand, in 1921 a serious slump was experienced due to various industrial disturbances and falling prices. Figures for 1922 may, therefore, be taken as a better gauge of production. In that year the total value of these primary products was over 170 million dollars. Of interest in this connection are the figures in Table Xe giving the value of primary timber production by provinces and the volume of timber consumed in each case. Table Xf gives the values of the primary forest products.

As implied above, however, these figures do not by any means indicate the total value of the forest as a source of production. If we merely add to the above the net value* of sawmill and pulp mill products, the total value in

*By "net value" is meant the value of pulpmill and sawmill production less the cost of pulpwood and sawlogs entering into manufacture of pulp and lumber.

14-15 GEORGE V, A. 1924

1922 was upwards of 266 million dollars. Going a step further, and including the net value of paper products, the total production exceeded 323 millions. In attaining even the latter figure, there have been included only the main industries directly dependent upon wood. If to this there be added the production of other manufactories in which wood in some form is the essential raw material, the total value of production from wood reaches upward of 400 million dollars. As a matter of fact, forest industries rank second only to agriculture in the value of production, and are therefore of great national importance in development of the country. Aside from monetary values in production, the sawmills, pulp and paper mills, and the logging operations basic thereto, give employment to upwards of 100,000 persons; and the capital invested therein reaches close to 600 millions of dollars.

TABLE XE.—PRIMARY FOREST PRODUCTION—CANADA, 1922

	Standing Timber consumed	Total Value
	cu. ft.	\$
Canada.....	2,377,845,182	170,850,096
Quebec.....	794,950,736	56,981,829
Ontario.....	655,604,824	52,639,909
British Columbia.....	447,433,011	30,666,860
New Brunswick.....	200,993,104	15,628,228
Nova Scotia.....	107,604,716	7,079,738
Alberta.....	54,821,103	2,502,151
Manitoba.....	52,097,177	2,595,641
Saskatchewan.....	49,398,813	2,088,626
Prince Edward Island.....	14,941,598	667,114

TABLE XF.—PRIMARY FOREST PRODUCTION, 1922

Products	Unit Used	Quantity reported or estimated	Convert- ing factor	Standing timber consumed	Total value
			cu. ft.	cu. ft.	\$
Totals.....				2,377,845,182	170,850,096
Firewood.....	Cords	8,860,846	95	841,780,560	38,228,702
Ties.....	No.	14,558,063	12	174,696,756	13,215,986
Poles.....	"	436,899	13	5,679,687	1,707,378
Posts.....	"	13,848,569	2	27,697,138	1,354,268
Rails.....	"	5,265,325	2	10,530,650	450,133
Mining timber.....	M ft. b.m.	70,486	219	15,436,434	1,721,025
Wood distillation.....	Cords	59,169	123	7,277,787	479,299
Logs used in sawmills.....	M ft. b.m.	3,408,264	219	746,409,816	55,066,273
Pulpwood used.....	Cords	2,912,608	117	340,775,136	40,375,599
Miscellaneous products.....	"	84,848	117	9,927,216	850,078
Square timber exported.....	M ft. b.m.	55,140	219	12,075,660	1,492,344
Logs exported.....	"	185,489	219	40,622,091	3,270,575
Pulpwood exported.....	Cords	1,011,332	117	118,325,844	10,359,762
Miscellaneous exports.....	"	227,441	117	26,610,597	2,278,674

It is almost a platitude to state that the preservation of an industry of such gigantic proportions—involving as it does, the investment of so much wealth and the employment of so many people—is a matter of primary importance to the people of this country. Basic to continuance and further development of the forest industry, however, is the sustentation of supplies of the raw material, wood,—and consequently of the forests. Through several generations—deluded by what appeared to be a surfeit of supplies—we have, through extravagant exploitation and neglect in adequate protection, made very serious inroads upon the timber supplies.

SESSIONAL PAPER No. 310

It is essential to discussion of the subject under review to enquire a little more closely into the two main branches of forest industry, viz., the pulp and lumber manufacturing operations.

(a) THE PULP INDUSTRY IN CANADA

Much has been written of the early development of pulp manufacturing. So far as manufacture of pulp from wood is concerned, historical record of the industry is complete, for it is only within comparatively recent years that pulp has been made from wood on a commercial scale. The present enquiry, however, relates more particularly to the availability and use of wood for this purpose; consequently no attempt is made to review the history of the industry; rather, discussion will be confined to a period of ten or fifteen years, during which time the industry has become such an important factor in depletion of timber supplies.

Capital invested in the pulp industry closely approximates 400 million dollars. The industry includes over a hundred mills, most of which are situated in Quebec, Ontario, British Columbia and New Brunswick. As stated in Chapter II, Nova Scotia has several mills, but they are small in size, and their total production is not large. The remaining four provinces have as yet no pulp mills. The combined value of pulp and paper commodities manufactured amounts to over 140 million dollars annually. These pulp and paper mills give regular employment to some 25,000 operatives, exclusive of employees engaged in the cutting and removal of pulpwood supplies; in the latter operations another 25,000 employees are engaged at certain seasons of the year. The annual wage bill in the milling end of the industry approximates 35 million dollars, and in addition probably 20 or 25 millions of the amount expended for wood supplies constitutes wages to woods operators.

Table Xg gives figures for pulp production of the several classes over the period 1908 to 1922, from which is readily perceived the rapid growth of the industry in nearly all phases. Only in the production of soda pulp is a lack of progress noticeable; for ground-wood, sulphite and sulphate, the increase has been phenomenal. Moreover, when the scale of present operations is considered, it is evident that volume development has been largely a matter of 15 years.

TABLE Xg.—PRODUCTION OF WOOD-PULP IN CANADA, 1908-1922

Year	Ground-wood	Sulphite	Sulphate	Soda	Total
	tons	tons	tons	tons	tons
1908.....	278,570	82,311	.....	2,178	363,079
1909.....	325,609	114,926	.....	4,873	445,408
1910.....	370,195	95,987	.....	8,422	474,604
1911.....	362,321	110,391	.....	24,121	496,833
1912.....	499,226	142,978	33,469	6,959	682,632
1913.....	600,216	183,552	68,284	2,572	854,624
1914.....	644,924	217,550	70,333	1,893	934,700
1915.....	743,776	235,474	92,405	3,150	1,074,805
1916.....	827,258	363,972	100,977	3,877	1,296,084
1917.....	923,731	374,894	161,547	4,136	1,464,308
1918.....	879,510	494,322	179,600	3,761	1,557,193
1919.....	990,902	562,115	158,475	4,597	1,716,089
1920.....	1,090,114	675,733	188,487	5,768	1,960,102
1921.....	931,560	481,984	131,337	4,201	1,549,082
1922.....	1,241,185	678,878	217,862	793	2,150,251

Several factors have contributed to this development; firstly, increased markets in the United States, due to enormous increase in the consumption of paper products, coupled with the inability of the industry in the eastern part of that country to proportionately increase its output, owing to lack of pulpwood

14-15 GEORGE V, A. 1924

supplier and adequate supplies of cheap power; secondly, the availability of timber supplies in Canada, so located as to permit of cutting and transportation at reasonable cost; finally, the presence in this country of abundant opportunities for hydro-electric development, so necessary for the economical grinding of wood and so desirable in the manufacture of paper.

Detailed figures of pulp production in the various provinces have already been given. Summarizing for the Dominion, Table Xh shows the extent to which the provinces have contributed to the total.

TABLE Xh.—PULP PRODUCTION BY PROVINCES—CANADA, 1908-1922

Year	Quebec	Ontario	British Columbia	New Brunswick	Nova Scotia	Total for Canada
	tons	tons	tons	tons	tons	tons
1908.....	201,450	108,124	.....	36,711	16,794	363,079
1909.....	238,286	132,491	644	49,991	23,996	445,408
1910.....	282,938	156,076	350	9,285	25,955	474,604
1911.....	312,522	140,959	90	24,163	19,099	496,833
1912.....	459,420	142,257	25,254	29,525	26,176	682,632
1913.....	514,299	228,498	61,354	29,911	20,562	854,624
1914.....	515,409	325,233	56,352	26,829	10,777	934,600
1915.....	561,793	364,226	65,823	62,093	20,870	1,074,805
1916.....	686,604	473,014	78,655	43,374	14,437	1,296,084
1917.....	784,250	489,488	111,875	58,340	20,355	1,464,308
1918.....	802,030	505,366	173,161	66,619	10,017	1,557,193
1919.....	831,291	597,827	194,126	75,186	17,659	1,716,089
1920.....	974,766	654,401	218,482	89,069	23,384	1,960,102
1921.....	784,906	519,511	165,053	61,810	17,802	1,549,082
1922.....	1,088,205	726,308	198,426	99,750	37,562	2,150,251

Quebec stands considerably in the lead, with 50.6 per cent of the total pulp production in Canada in 1922. Ontario follows with 33.8 per cent, more than one-third of the Dominion total. British Columbia with 9.2 per cent; New Brunswick, with 4.6 per cent; and Nova Scotia, with 1.7 per cent, complete the list. Quebec is also strongly in the lead for every individual class of pulp; Ontario being second for all classes except sulphate, which is produced in greater quantity in New Brunswick. Nova Scotia produces nothing but groundwood, and supplies 3 per cent of the Dominion production of that class of pulp.

As will be seen in Table Xi, the paper manufacturing industry has also experienced notable progress during the 6-year period for which figures are available. Particularly is this the case with newsprint, which constitutes over

TABLE Xi.—PAPER MANUFACTURE IN CANADA

Year	Newsprint	Book and Writing	Wrapping	Boards	Miscellaneous	Total
	tons	tons	tons	tons	tons	tons
1917.....	689,847	48,141	50,360	54,080	11,261	853,689
1918.....	734,783	48,150	61,180	87,749	35,862	967,724
1919.....	794,567	58,228	59,697	137,678	40,065	1,090,235
1920.....	875,696	73,196	77,292	158,041	30,726	1,214,951
1921.....	805,114	53,530	52,898	89,120	18,285	1,018,947
1922.....	1,081,364	64,808	81,793	113,200	25,650	1,366,815

79 per cent of Canada's total output of paper products. Substantial progress is noted also in the manufacture of wrapping paper and paper boards. Development in the manufacture of book and writing papers, although considerable, has

SESSIONAL PAPER No. 310

not been so pronounced as in the case of other products, due to the fact that markets have been more restricted. Ontario leads in paper production with 47.4 per cent of the Dominion total to her credit; moreover, with the exception of wrapping papers, she leads in all individual classes of paper products. Quebec is a close second, with 43 per cent of total production. Finally, British Columbia, with 9.6 per cent, consisting entirely of newsprint and wrapping papers. Within the past year, only, paper has been produced for the first time in the Maritime Provinces, at Bathurst, N.B.

Some idea of the importance of the pulp industry in Canada's external trade may be gleaned from the fact that with a total value of pulp produced in 1922, approximating 85 million dollars, pulp to the value of 41 millions was exported; of this, United States purchased over 33 million dollars worth, 80 per cent of the total exports. Great Britain was the next best customer, taking seventeen per cent; Japan, three per cent; and numerous other countries, smaller quantities.

Of total paper production in 1922, amounting in value to over 106 million dollars, exports exceeded 75 million dollars, of which the United States took about 65 million dollars, nearly 87 per cent of all paper exports. Newsprint forms over 90 per cent of the total value of paper exported, and in 1922 the United States imported this commodity to the value of nearly 63 million dollars. It is at once observed that United States imports of paper products, made in Canada, consist essentially of newsprint. Other countries buy from Canada relatively greater quantities of other paper products than does the United States. "Canada supplies over eighty per cent of the newsprint paper imported annually into the United States. Over two-thirds of the total consumption of newsprint by that country is either of Canadian manufacture or is made of pulpwood or wood pulp imported from Canada."*

With a net value** of products of Canadian pulp and paper mills, amounting in 1922 to 141 million dollars, exports of pulp and paper commodities to the United States aggregated 98 million dollars—about 70 per cent of Canada's total production of pulp and paper.

It is of special interest to note here, that if the value of exported pulpwood be included, the aggregate value of pulpwood, pulp, and paper production in Canada in 1922 was approximately \$151,400,000; of this amount, the United States purchased approximately \$108,400,000—71.6 per cent of total value production. Manifestly, contributing in such large measure to Canada's export trade, the industry is one of utmost importance. Combined pulp and paper imports in 1922, approximated only \$9,300,000; whereas combined exports of the same commodities to all foreign countries totalled \$115,800,000—the gross† contribution of the industry toward favourable trade balance being more than 106 million dollars.

(B) THE LUMBER INDUSTRY IN CANADA

Deeply written in the history of, and intricately related to, the industrial development of Canada, is the story of the lumbering industry. From earliest times, the forest, although the subject of destructive attacks for the purpose of land clearing, has nevertheless been looked upon as a source of supply for the main materials entering into construction operations. First of all, used in the round; later, squared for export; finally, sawn into lumber and other more finished forms,—timber development has been continuous and rapid.

In a country so young, and with such extensive areas of true forest land at its disposal, it is rather difficult to comprehend that the peak in lumber production may already have been passed. Unfortunately, reliable statistics for

*Census of Industry: The Pulp and Paper Industry, 1921 and 1922; Dominion Bureau of Statistics.

**The value of the pulp entering into the manufacture of paper has been deducted.

†To arrive at the net effect of the industry on trade balance, it would, of course, be necessary to take into consideration the value of materials imported to assist in production.

production prior to 1908, are not available, and definite comparisons cannot therefore be made between figures for production subsequent to 1908 and the years which preceded it. In view of the fact that large volume in lumber production has been brought about by the introduction of large-scale equipment and methods, developed during the present generation; also, due to the development of markets for the lumber of British Columbia, in which province the timber wealth is great; there is some possibility of reaching a hasty conclusion that the 1911 peak in Canadian lumber production constituted the absolute peak in the history of the industry. It may be pointed out, however, that for many years preceding 1908 there was in the eastern provinces an enormous production of white pine timber, much of it exported as squares; and such figures as are available indicate that it is quite possible that the absolute peak in production actually occurred some years prior to 1908.

We may, however, confine discussion to the period for which adequate figures are available. In 1908 the total lumber production was 3.35 billion feet, board measure. The three succeeding years witnessed rapid and almost constant increase to a maximum of 4.92 billion feet in 1911. For the period presently under consideration, the latter year furnished the highest peak in lumber manufacture. Production then steadily decreased in 1912 and 1913 to 3.82 billion, rising again to 3.95 billion feet in 1914. The years 1915 and 1916 showed decrease to 3.49 billion. Recovery occurred in 1917, when the total cut was 4.15 billion feet, but production again fell off through 1918 and 1919 to 3.82 billion. The year 1920, in which active interest was displayed in all forms of forest industry, showed a total cut of 4.3 billion feet, but this was in turn followed by a drop in 1921 to lowest figures on the statistical records, namely, 2.87 billion feet. 1922, the latest year for which figures are available, shows recovery only to 3.14 billion feet.

Taking into consideration the additional drain upon forest resources which the introduction of the pulp industry has entailed, it seems at least doubtful that the peak figure of 4.9 billion feet, attained in 1911, will again be reached. Only in British Columbia are there supplies available to an extent which would justify the conjecture that total production may again rise so closely to or in excess of the 5 billion mark.

Throughout the whole period 1908 to 1922, spruce has been far in the lead of all other species in consumption for lumber; in Ontario and British Columbia only it yields first place to white pine and Douglas fir, respectively, but in all other provinces it has been the main species in lumber manufacture. Until and including 1912, white pine ranked second for the Dominion; giving way to Douglas fir in the year 1913, it again superseded the latter, and retained second place from 1914 to 1918. In 1919 white pine again dropped to third position, its place being taken by Douglas fir in that year; apparently the latter species will always retain second position, unless indeed it overtakes spruce in first place; at all events, it seems to have completely outdistanced white pine. Hemlock has consistently occupied fourth place in production over the period. Fifth, in point of volume production, for all but 3 of the 15 years, is the aggregate of all hardwoods. Finally, red pine, cedar, balsam, yellow pine and tamarack (larch) have contributed to the total, amounts varying for different species and for different years all the way from 15 or 20 million to 150 million.

An analysis of lumber production from the various species over the decade 1913-1922, the figures for which appear in Table Xj, is of interest. Spruce provided 34.7 per cent of all the lumber produced; Douglas fir, 19 per cent; white pine, 18 per cent; and hemlock, 7 per cent; the aggregate for these four species being 78.7 per cent of the total. Of particular importance is the fact that spruce furnished over one-third of the supplies for all lumber produced in the country,

SESSIONAL PAPER No. 310

as well as furnishing the great bulk of the pulpwood supplies. The average annual consumption of all species was approximately 3.7 billion feet; of spruce, about 1.3 billion; Douglas fir, 700 million; white pine, 670 million; and hemlock, 260 million.

Ontario led all provinces in total lumber production up to 1912, British Columbia being second, and Quebec third. In 1913, British Columbia temporarily assumed first place, Ontario dropping to second position. In 1914 and 1915 Quebec took the lead, followed by Ontario and British Columbia. In 1916 the production of these three provinces was very close, Ontario leading, British Columbia and Quebec following. In 1917 British Columbia took the lead, and Ontario and Quebec definitely settled into second and third places, respectively; and these relative positions have been maintained ever since. There is every reason to believe that British Columbia will permanently retain the lead, which she has attained by virtue of abundant supplies and a much wider market than this province previously enjoyed. New Brunswick has consistently occupied fourth place; Nova Scotia fifth, followed by the prairie provinces and Prince Edward Island.

TABLE XJ.—CANADA: LUMBER PRODUCTION, 1913 TO 1922 INCLUSIVE, BY KINDS OF WOOD, QUANTITY CUT AND VALUE

Kinds of Wood	1913		1914		1915		1916		1917	
	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value
		\$		\$		\$		\$		\$
Spruce.....	1,274,215	19,125,837	1,441,438	21,199,799	1,564,113	23,843,548	1,340,678	21,201,198	1,466,558	27,870,543
Douglas Fir.....	793,143	10,898,978	601,643	6,810,000	453,534	5,333,573	574,626	8,070,200	704,412	12,491,258
White Pine.....	678,330	18,502,041	667,678	13,880,255	849,196	17,584,149	719,140	14,957,048	791,592	18,997,428
Hemlock.....	306,342	4,505,767	334,361	4,734,229	238,992	3,271,612	177,354	2,583,566	324,107	6,437,180
Red Pine.....	144,320	2,688,653	107,763	1,935,543	122,387	2,206,840	61,653	1,175,835	102,751	2,508,181
Cedar.....	101,053	1,487,633	118,738	1,294,238	67,366	1,172,279	91,375	1,666,455	148,364	2,738,287
Larch.....	96,325	1,327,672	71,791	882,188	36,192	491,687	40,031	630,642	53,844	980,970
Birch.....	79,360	1,424,236	76,424	1,247,816	85,733	1,437,658	81,543	1,478,970	60,576	1,533,223
Maple.....	73,580	1,303,315	66,610	1,283,643	47,418	848,091	32,402	639,182	21,105	552,964
Balsam Fir.....	64,957	845,955	256,452	3,654,741	233,521	3,327,839	180,349	2,679,494	104,957	1,976,790
Yellow Pine.....	58,939	874,014	34,616	463,525	35,166	457,758	92,698	1,455,396	75,102	1,726,113
Basswood.....	36,009	773,381	38,013	752,108	24,382	489,217	18,616	373,592	14,790	369,764
Jack Pine.....	35,404	508,840	44,000	626,108	31,283	481,323	37,929	652,353	19,825	427,105
Elm.....	30,766	653,699	29,490	610,041	23,795	454,497	15,750	324,582	15,850	337,092
Beech.....	12,983	208,332	15,686	250,301	5,343	88,000	6,403	102,762	16,102	321,759
Poplar.....	11,136	153,376	21,621	264,430	9,324	113,873	9,064	124,591	9,526	158,482
Ash.....	10,509	234,303	9,941	204,919	9,647	180,484	6,516	126,608	6,650	152,097
Oak.....	6,348	207,156	5,854	174,826	3,166	89,784	3,149	92,541	1,894	76,242
Chestnut.....	1,317	25,372	1,163	25,942	522	12,043	457	10,898	276	10,911
Hickory.....	647	23,726	900	25,299	203	5,534	144	5,059	168	6,761
Butternut.....	516	12,306	1,431	25,309	361	12,372	200	5,266	121	2,773
Cherry.....	246	6,171	535	15,237	123	3,826	170	5,040	51	3,511
Black Gum.....	123	3,000	12	168						
Walnut.....	40	2,017	46	1,727	28	968	32	1,178	51	4,135
Tulip.....	20	358	23	412	1	18				
Sycamore.....	11	255								
Sassafras.....	1	45								
Yellow Cypress.....			19	475	880	12,833	271	2,893	46	698
Red Alder.....			6	90					5	100
Other kinds.....									52,348	944,897
Custom sawing.....									160,632	3,025,833
Whitewood.....										
Totals.....	3,816,642	65,796,438	3,946,254	60,353,369	3,842,676	61,919,806	3,490,550	58,365,349	4,151,703	83,655,097

TABLE Xj—CANADA: LUMBER PRODUCTION, 1913 TO 1922, ETC.—*Con.*

Kinds of Wood	1918		1919		1920		1921		1922	
	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value	M Ft. B.M.	Value
		\$		\$		\$		\$		\$
Spruce.....	1,142,777	29,198,716	1,335,297	43,954,446	1,490,098	56,089,633	874,456	24,621,202	1,018,333	25,743,197
Douglas Fir.....	715,812	17,347,058	817,591	22,395,242	901,915	34,412,916	680,845	16,613,882	820,724	18,778,646
White Pine.....	808,652	26,958,500	479,937	19,872,271	641,637	29,602,205	480,214	17,228,634	576,292	20,520,044
Hemlock.....	273,356	6,753,119	234,785	6,899,719	319,592	11,306,052	232,169	6,114,436	204,742	4,848,002
Red Pine.....	102,105	3,354,827	89,198	3,404,029	96,253	3,925,008	85,530	2,515,507	67,173	1,993,033
Cedar.....	130,228	3,186,565	98,808	3,148,810	197,004	7,169,963	95,675	2,799,167	102,603	3,275,171
Larch.....	77,135	1,943,269	16,490	438,333	73,233	2,783,232	35,323	823,181	30,087	628,875
Birch.....	76,165	2,215,847	72,286	2,780,984	95,920	4,267,480	88,609	3,007,682	60,966	2,034,354
Maple.....	47,884	1,355,255	37,485	1,408,268	57,714	2,512,079	47,962	1,771,742	30,185	1,052,831
Balsam Fir.....	94,774	2,260,196	139,538	4,271,272	132,390	4,733,598	71,707	1,834,217	97,716	2,174,650
Yellow Pine.....	64,737	1,425,447	37,776	1,081,287	80,578	2,899,820	40,020	1,001,493	30,708	715,405
Basswood.....	23,965	569,100	25,247	945,002	29,428	1,259,478	26,118	914,700	18,036	594,763
Jack Pine.....	23,512	638,306	45,016	1,359,245	81,885	3,203,812	51,574	1,268,086	43,209	996,534
Elm.....	19,016	423,840	15,709	564,690	26,637	1,074,701	21,063	710,208	15,515	519,883
Beech.....	8,321	218,620	10,581	338,236	8,494	330,040	8,445	243,559	4,841	140,700
Poplar.....	13,945	302,058	13,584	435,165	15,530	563,659	10,679	332,548	3,498	86,422
Ash.....	7,827	197,254	7,035	245,162	10,145	422,549	8,723	310,583	6,175	196,676
Oak.....	3,014	109,599	2,829	133,591	4,727	222,761	3,052	149,909	2,572	119,943
Chestnut.....	735	22,191	631	21,073	699	33,690	371	18,558	479	22,586
Hickory.....	213	8,910	181	5,281	165	6,605	174	8,154	135	6,712
Butternut.....	264	10,050	374	13,592	478	19,259	335	13,018	280	9,827
Cherry.....	251	6,296	297	8,086	983	40,139	216	8,794	196	7,583
Black Gum.....										
Walnut.....	12	705	35	1,425	107	6,120	23	1,765	76	3,537
Tulip.....										
Sycamore.....									5	150
Sassafras.....										
Yellow Cypress.....	8,219	186,566	10	400					42	1,260
Red Alder.....	55	1,087	7	295	35	1,220	9	207	20	360
Other kinds.....	35,209	753,225	30,646	835,812	33,107	1,285,968	6,009	137,323	3,976	81,928
Custom Sawing.....	208,448	4,254,014	308,377	7,468,937						
Whitewood.....									14	1,000
Totals.....	3,886,631	103,700,620	3,819,750	122,030,653	4,298,804	168,171,987	2,869,307	82,448,585	3,138,598	84,554,072

TABLE Xk
CANADA: LUMBER PRODUCTION, BY PROVINCES, 1908-1922

Thousands of Feet—Board Measure

Year	Nova Scotia	New Brunswick	Prince Edward Island	Quebec	Ontario	Mani- toba	Saskat- chewan	Alberta	British Columbia	Yukon	Canada Total
1908.....	216,825	308,400	No report	690,135	1,294,794	56,447	91,166	41,382	647,977		3,347,126
1909.....	273,551	391,203	1,874	638,582	1,519,080	59,861	87,340	52,850	790,601		3,814,942
1910.....	260,871	419,233	5,273	790,197	1,642,191	42,922	75,931	45,127	1,169,907		4,451,652
1911.....	388,114	467,500	7,715	756,508	1,716,849	53,745	134,745	51,084	1,341,942		4,918,202
1912.....	312,763	449,738	6,771	677,215	1,385,186	39,535	157,255	47,478	1,313,782		4,389,723
1913.....	274,722	399,247	6,391	630,346	1,101,066	71,961	114,800	44,462	1,173,647		3,816,642
1914.....	279,044	414,808	6,790	1,118,298	1,044,131	44,658	56,677	45,236	936,612		3,946,264
1915.....	294,475	633,518	7,453	1,078,787	1,035,341	42,357	62,864	17,975	669,816		3,842,676
1916.....	220,718	513,655	7,331	818,523	894,050	57,711	84,275	18,350	875,937		3,490,550
1917.....	236,710	593,497	6,896	827,574	1,110,264	54,216	88,375	33,627	1,200,544		4,151,703
1918.....	176,332	442,625	6,393	841,084	1,110,062	54,047	75,835	22,388	1,157,636	229	3,886,631
1919.....	224,804	497,593	8,971	884,612	940,199	30,353	42,452	26,173	1,164,340	253	3,819,750
1920.....	273,978	515,785	6,241	916,422	992,901	58,419	54,371	41,229	1,443,270	179	4,298,804
1921.....	115,246	269,983	5,803	649,334	734,054	61,727	10,892	26,002	996,260		2,869,307
1922.....	101,451	360,030	3,472	649,354	776,280	54,930	9,609	25,618	1,157,554		3,138,598

Of considerable interest, and closely allied with the sawmill business proper, is the production of lath and of shingles. Of the former, the total production in 1922 was over 1 billion, with a value of approximately \$5,700,000. Of this spruce supplied nearly 50 per cent; white pine, nearly 20 per cent; hemlock, Douglas fir, cedar, and miscellaneous species following in the order named.

SESSIONAL PAPER No. 310

Ontario leads in lath production, supplying about one-third of the total, closely followed by New Brunswick and Quebec. Relatively much smaller quantities are produced in British Columbia and Nova Scotia. To a great extent, laths are produced from slabs, edgings and other waste of lumber manufacture, but with increase in the price of and markets for this commodity, the tendency has been to use material that otherwise would be sawn into lumber. Furthermore, as mentioned in Chapter III, in New Brunswick, and to a certain extent in Nova Scotia, there are many instances where timber is actually cut specifically for the purpose of lath manufacture.

The shingle industry is of even greater importance, particularly in British Columbia where high-grade raw materials therefor are abundant. In 1922, the total shingle cut in Canada was some 2.5 billion, valued at \$10,400,000. Over 95 per cent of the shingle cut is of cedar, and British Columbia furnishes about three-quarters of the Dominion total. Quebec and New Brunswick, together, produce over 20 per cent, Ontario and the other provinces contributing very small proportions of total production. In contradistinction to the lath industry, shingles are, as a general rule, sawn from timber cut especially for that purpose.

In 1922 the capital invested in the sawmill and allied industries approximated 165 million dollars, and the total value of products, not including pulpwood sawn at such mills, was 106 million dollars. Both of these figures represent a decrease, however, from 1920 when the lumber cut was over 4 billion feet and shingle production nearly 3 billion. In 1922, all of these mills gave employment to some 32,000 persons; in 1920, to over 40,000.

Although neither in point of capital invested, nor in the value of production, is the industry on such a large scale as the pulp industry, it is nevertheless one of great magnitude, and its continuance on a permanent basis is a matter of transcending importance to Canada. It provides all-important commodities for domestic consumption, and is itself the basis of many other industries. Very important also is its relation to the external trade of the country. For the four-year period 1919 to 1922, the average annual value of lumber, square timber, shingles, and lath, exported from Canada was \$76,300,000; average annual imports of the same commodities over the same period amounted to \$9,500,000. The difference, \$66,800,000 was the contribution of these particular branches of forest industry toward attainment of a favourable trade balance.

(C) OTHER BRANCHES OF FOREST INDUSTRY

While obviously the pulp and the lumber industries are by far the more important, there are other activities associated with total forest production of the country. In more recent years effort has been made to segregate figures for the logging operations, as distinct from pulp, lumber, and other manufactories. Figures for the logging industry include production of sawlogs, square timber, pulpwood, ties, poles, posts, piling, and mine timber, fuelwood, etc. In 1922 the total capital invested was 35 million dollars, and total value production 116 million dollars, the former may reasonably be added to the capital figures presented for the other branches of forest industry. The production value, however, may not be so treated; manifestly, the value of all logs sawn into lumber, lath and shingles, or converted into pulp, have already been taken care of in production values quoted for those industries. We may, however, by elimination of the latter, arrive at a net production value for the logging industry. Including fuelwood, poles, posts, rails, mine timber, and wood used in distillation processes, etc., the net production value of these products in 1922 was approximately 75 million dollars. Not including farmers or small wood cutters, who carry on independently, the logging industry gives seasonal employment to some 35,000 persons.

While there are still other forms of industry dependent upon woods supplies, the majority of them are concerned with the higher or more complete processes of manufacture. It is fitting that brief reference be made at this stage, however, to the importance of woods operations on the farms. Here is an industry which, although unorganized, and perhaps not amounting to a very great deal in the individual case, is in the aggregate one of very considerable proportions. In 1920, the total value of ordinary forest products on the farms of Canada was \$67,700,000. If to this figure there be added the value of maple syrup and maple sugar—obviously a product of the forest—the total is increased to over 72 million dollars. Comparison with other agricultural values is of interest. The 72 million dollars of forest products, arrived at above, was more than 11 per cent of the total value of all grain crops produced on the farms of Canada in 1920; over 32 per cent of the value of all forage crops; over 11 per cent greater in value than the value of all field crops other than the foregoing, i.e. greater than the aggregate of all root crops, tobacco, hops, flax, etc.; more than two-and-three-quarter times the value of all fruit crops produced on the farms; finally, considerably greater in value than total egg production.

Manifestly, aside from their importance in organized industry, forest activities play a most important part in the pursuits of the rural populace.

(D) GENERAL

The aggregate of figures quoted in subsections (a), (b), and (c), preceding, is illuminating. As previously intimated, and without including all of the money invested in standing timber, the capital invested directly in forest industry is about 600 million dollars; total production value, up to and including the lumber and pulp stages, 266 millions; and if paper products be included, 323 million dollars. As against the latter figure exports of these commodities totalled 210 millions, nearly two-thirds of total production. Viewing the matter from another standpoint, imports of the same products approximated 19 million dollars, and the favourable trade balance was therefore 191 million dollars. If we were to include in the exports and imports, figures for furniture, doors, sashes, cooperage, and others of the more highly manufactured articles, it would be necessary to deduct some 3 million dollars from the favourable trade balance of 191 million dollars, previously arrived at.

Canada's grand total exports of all commodities for the calendar year 1922 approximated 885 million dollars; of this amount, wood products contributed 210 millions, almost one-quarter of the whole. Canada's exports of wood products to the United States amounted to 175 million dollars; that is to say, five-sixths of all-wood products which were exported went to the United States. Finally, of Canada's total exports to the latter country, amounting to 340 million dollars, wood products contributed over one-half. In our trade with that country, therefore, the forest products play even a greater part than agricultural products. Even a cursory study of these facts reveals how important are the forest industries in our external trade, and consequently, how fundamental to national prosperity are the protection and management of the forest resources, so that the supply of raw materials, upon which these industries are entirely dependent for their success, may be perpetuated.

SECTION 7—SUMMARY OF SITUATION: DURATION OF SUPPLIES

In discussion relating to the individual provinces a clear conception has been given of the pulpwood situation in the various parts of the country. The fallacy of calculating probable duration of supplies by division of total available pulpwood resources by annual consumption has been consistently and intentionally emphasized. In some districts the result secured in this manner might

SESSIONAL PAPER No. 310

by chance approximate the true condition, but in the lack of detailed data regarding losses due to other factors in depletion—fire, insects, and decay—such fortuitous calculations are necessarily not to be depended upon. As previously intimated, however, they may be made to serve two useful purposes; first, to offset panic propaganda that portends cessation of forest industry in the immediate future; and, on the other hand, to show the absolute impossibility of permanently sustaining forest industries under present wasteful methods and lack of adequate protection to mature and immature timber.

Within the foregoing limitations it may be stated that division of total annual consumption into the amount of available pulpwood in Canada gives a quotient indicating 63 years' supply. By regions, a similar process would indicate supplies for 31 years in the Maritime Provinces; 51 years' supplies in Ontario and Quebec, taken together; and 195 years' supplies in the province of British Columbia. Taken precisely as they stand, the figures for the eastern provinces, although by no means portraying the gloomy situation that some ardent advocates would urge upon us, nevertheless do indicate how appropriate and essential is a most careful and thoroughly candid consideration of supplies, at the present moment.

Equally uncertain, in the lack of sufficient data, are calculations which presume on definite rates of growth. As pointed out in some detail in Chapter II, Section 10, the most exaggerated ideas of forest increment are prevalent. Firstly, the fact is frequently overlooked that in the mature forest there is no net increment; the growth of individual trees therein is totally offset, and in many cases more than counteracted, by natural losses in the whole stand. Secondly, the growth in younger stands under natural conditions in the forest is much less than it is commonly supposed to be. Undoubtedly the reason for prevailing misconceptions in this regard is that the growth performance of individual trees grown in the open, under better light conditions, and very frequently on more favourable soils, is erroneously applied to timber growing under less favourable conditions in the forest, thus exaggerating out of all measure the increment in the forest. Too frequently, also, the enthusiast will point to some tree which has been set out as a transplant from the tree nursery, and which has received attentive care during the course of its life, and will then translate into terms of forest increment the attainments of the highly favoured individual tree,—one would be as fully justified in expecting that the almost countless plants derived from a spring seeding of garden vegetables would, without judicious thinning, each reach maturity.

Although perhaps the very last thing which the Commission would care to have laid at its door, would be that of minimizing or underrating in any manner the losses due to forest fires, it has, during the course of the enquiry, been thoroughly impressed upon us that in some quarters the most extravagant ideas prevail regarding the losses annually sustained through forest fires. Frequently, one reads or hears statements to the effect that ten, eight, six, or five times the amount of timber which is annually utilized, falls prey to fire.

If such statements were confined to the expression of total losses which have in the past years been sustained from this cause, as compared to the amounts which have heretofore been consumed through legitimate industry, perhaps no serious objection might be made. The extreme propagandist, however, ignores essential fact, when he translates past occurrences into annual happenings. By such melodramatic statements he may do a great deal to arouse some people from a state of apathy; yet, at the same time, he may engender in the minds of those seriously and patriotically interested in the problem, the fear that, if the losses are as great as they are by the extremist claimed to be, there is in Canada but little hope of finally surmounting the fire difficulties.

There is, after all, some limit to the expenditures which may be made in fire protection, and we might as well candidly admit that, if fire losses in this country were ten times as great as annual utilization, there would be little hope in this country—or in any other country similarly situated financially, and with respect to markets for forest products—of finding the wherewithal to finance a scheme of forest fire defence which would be impenetrable. A much better purpose will be served, and much greater confidence inspired in our ability to conquer the forest fire evil, if we look the situation fairly and squarely in the face—neither minimizing nor exaggerating the losses annually sustained. The best available figures, while lacking the lurid complexion of statements so often set before us, most assuredly portray a situation that demands vigorous action and unceasing effort on the part of the governments, the industry, and the people of Canada.

Based upon the losses sustained from 1918 to 1922, Canada's average annual forest fire bill was \$14,500,000. During this period more than $3\frac{1}{2}$ million acres of merchantable timber was burned over; over 4 million acres of young growth; and some $2\frac{1}{2}$ million acres of cut-over lands, upon which the young growth which had been established was destroyed. The \$14,500,000, mentioned above, includes the stumpage value of the timber destroyed, and the cost of actual fire fighting operations—some $2\frac{1}{2}$ million dollars—but does not include the regular expenditures in fire protective work, although the latter are directly incurred because of the existing fire hazards. Such figures, however, do not give a true indication of the economic loss sustained as a result of forest fires. In the forest industry, perhaps more than any other, the cost of manufactured products to a very great extent consists of labour charges. Therefore, in addition to loss in stumpage values, and expenditures in fire fighting operations, forest fires entail direct loss in the employment value of any district which they may affect.

In 1923 forest fires were more severe than they had been for several years. Particularly in Ontario, Quebec, and New Brunswick, very heavy forest losses were suffered. The inclusion of figures for that year would therefore swell to much greater proportions the figures for losses previously quoted. For the whole of Canada, it is manifestly impossible to state the exact loss incurred in stands of the pulpwood species. In discussion relating to the various provinces, however, this has been done wherever possible.

Numerous references have also been made to losses through insect attacks. Unfortunately, it has only been at times when insect epidemics have occurred that public attention has been focused upon the extremely destructive nature of these pests. Thirty-five or forty years ago when the larch sawfly swept across from eastern to western Canada, killing out practically the entire stand of tamarack, but little attention had been given to the subject of forest entomology. Other insect attacks of lesser severity undoubtedly occurred during the following twenty-five years, but aside from noting the destruction which occurred, but little was done. In the last decade, the two infestations which have excited the most general or local attention have been the spruce budworm and the pine bark beetle attacks. Insofar as they affected pulpwood species, some idea of the resultant damage has been given. It is only necessary to accentuate here, that insect losses are very far from being limited to the epidemics which have aroused public concern in some districts. Forest insects are to be found wherever timber grows, just as the germs of many diseases may be found in a human body even though it be a moderately or entirely healthy one. It only remains for some overtaking of the vital conditions—a weakening in the constitution of the human body or the body of timber—and these enemies, germ or insect, as the case may be, assert themselves and become epidemic.

Scientific study of these insect depredations has clearly revealed that an epidemic results from a weakening in the vitality of the stand, either of the individual trees growing therein, or in a disturbance of natural growing

SESSIONAL PAPER No. 310

conditions. For instance, as a result of continuous exploitation of spruce in New Brunswick, for many generations, the balsam being left almost untouched, the proportion of the latter species in the stand increased very greatly. It was largely the preponderance of balsam, the favoured tree of the badly named "spruce budworm", in the New Brunswick forest, that induced conditions favourable to an epidemic outbreak of the insect. Similarly, in the dry belt in western Canada, the old stand of yellow pine, repeatedly scarred and otherwise injured by frequent fires, resulting in greatly reduced vitality, became the subject of the bark beetle epidemic.

With a knowledge that, in greater degree, forest insects attack dead, dying, or weakened trees, it requires only casual observation in any part of the woods which has been logged over, to realize the unhealthy conditions that are brought about by the methods of utilization which prevail in this country. After all, we are only at the beginning of studies of the forest insect problems which confront us, and the development of practical methods of control is of utmost importance. As is the case with so many ailments of the present day, the prevention of disease is in a large measure a question of improving conditions of general health; so, in forest insect control, practical success will probably only be attained when the methods under which our woods are operated, and the conditions in which they are left, are improved.

Still less is known of the fungus diseases which affect the forest, but the same may be said, namely, that reduced vitality of the forest is in large measure responsible for fungus trouble. No complete estimate of the damage done by any one or more of the many forest diseases due to fungus has been attempted. In more recent years the 'white pine blister rust' has reached the epidemic stage; much damage occurred in the United States and to a more limited extent in eastern Canada. In western Canada, also, the same disease has jeopardized the safety of the limited white pine resources of British Columbia. Of more significance from the standpoint of pulpwood supplies, however, is the rot in balsam; on many areas in eastern Canada the degree of rot in this species has reached the epidemic stage, and is the cause of widespread concern. These are but two specific illustrations of the losses which are sustained from attacks of these insidious enemies of forest growth. Here again, disease is in large measure the result of weakening of the stand, either by fire or by utilization in such a manner that the equilibrium of natural conditions is seriously disturbed.

There is, more or less, a cycle, or an inter-relation, in the attacks of these agents in depletion. Forest fires are almost invariably followed by insect attacks; so that even those trees which may not have been entirely killed by fire, are left in a weakened condition, and thus are very susceptible to insect attacks. The insects in turn still further weaken the stand, and open up countless avenues of ingress for the spores of destructive fungi.

Throughout Canada, the annual merchantable timber loss from fires is conservatively estimated at 800,000,000 cubic feet, and upwards of a million acres of young growth. During the last ten years the spruce budworm loss averaged 1,345,000,000 cubic feet per annum, in addition to the injury from bark beetles and other insects. The extent of losses due to fungi is, as previously explained, unknown. Including the timber utilized in forest industry, therefore, there is little doubt that the forests of Canada are being depleted at the rate of upwards of 5 billion cubic feet per annum, as against which there is the increment due to growth, the amount of which cannot be accurately determined.

In conclusion, it is desirable that reference be made to some economic conditions that prevail in the four main regions. In Chapters II and III, and more generally in the current chapter, it has been clearly enunciated that the

supplies available in the Maritime Provinces will not permit of further expansion of the pulp industry unless lumbering operations are in some measure curtailed; in fact, the continuation of both industries even on the present scale cannot much longer be maintained, even if fire and insect losses were to be reduced to a minimum. In Ontario and Quebec, the available supplies would probably render possible the sustention, on present scale, of both forms of industry, if fire and insect losses were to be controlled, but even on the latter assumption, comparatively little further expansion can be justified. In the Prairie Provinces permanence and limited expansion of the industry is very largely dependent on solution of the fire problem. Finally, in British Columbia the supplies are such as to permit large expansion on a permanent basis, if adequate fire protection be afforded, and more conservative methods of exploitation be adopted.

The question may well be asked, therefore,—in a case where curtailments is necessary, which of the two industries is the more important, and which should give way? In 1922 the sawmill industry, with capital invested approximately 165 millions, produced commodities valued at 106 million dollars, and gave employment to 32,000 persons; to effect this result standing timber to the extent of 746 million cubic feet was consumed. On the other hand, the pulp industry, with some 400 millions invested, produced commodities valued at 140 million dollars, and gave employment to 25,000 persons; to accomplish this 341 million cubic feet of standing timber was consumed,—less than half of the amount consumed by sawmills. From the foregoing it is clearly evident that, for a given quantity of timber consumed, the pulp industry is the more productive of commodity values, and offers relatively greater employment.

The reason for this is twofold; first, in the pulp and paper industry the degree of manufacture attained is much higher, and consequently, the production value from a given quantity of wood is greater; second, by the utilization of much smaller sizes in pulp manufacture, not only can more complete use be made of all trees that are cut, but upon arrival at the mill a much greater proportion of the wood—nearly all of it, in fact—finds its way into the manufacture, particularly in the mechanical process. In the sawmill operation, on the other hand, larger quantities of material are left in the woods, and again, at the mill there is a very large wastage of wood, which has given rise to that pre-eminently destructive appurtenance of the Canadian and American mills, the sawmill burner.

Accordingly, except insofar as the pulpwood operation induces a tendency to the cutting of immature timber, it may be conceded that from the standpoint of conservation of wood supplies, the use of the latter for pulp manufacture is the more economical. Were it not for other economic factors, the obvious conclusion might be that a province or district which is short of timber supplies should engage exclusively in pulp manufacture, and that it should depend upon outside sources of supply for lumber and allied products of the sawmill. As against such a deduction, however, it may be offered that there is no province in the Dominion where the sawmill industry should not play an important part in industrial life; true forest lands embrace relatively such a large proportion of the various provincial areas, and the products of the sawmill are of such great importance in urban and rural development, that, to say the least, each province should be able to supply in considerable measure its local requirements of sawmill products, if not actually to engage in export trade.

Cases very much in point are the provinces of New Brunswick and Nova Scotia. Timber supplies are inadequate for the sustention of present industries. While it is perhaps beyond the scope of this Commission to indicate the treatment which should be accorded, it is entirely within its prerogative to suggest, as has already been done, that an economic adjustment between consumption

SESSIONAL PAPER No. 310

in the two forms of industry is of paramount importance. Obviously, with the conditions of ownership which obtain in these provinces, there is room for, and the greatest necessity of, the closest degree of co-operation between the industries and the governmental authorities, in treatment of a problem that begs of solution.

The extent to which forest industries may be sustained on the basis of supplies available, and present rates of depletion, has been discussed in some detail. Each province, or at least each region, must be considered as an entity, demanding within itself the continuance of forest industry. For Canada as a whole, it may be forcibly stated that the continuance of forest production on the present scale, to say nothing of increasing the output, is absolutely contingent upon very material reduction in the amount of losses annually suffered from fires, insects, and decay.

Playing such a large part in the successful industrial development of this country, and contributing in such great measure to our external trade, the forest wealth of Canada simply must be placed upon the business basis of capital and interest, and depletion in all directions confined to the amount of timber which the forest is capable of producing.

PART II.

FUNDAMENTAL PRINCIPLES UNDERLYING A POLICY OF FOREST CONSERVATION FOR CANADA

CHAPTER I—PRELIMINARY CONSIDERATIONS

So much has been said and written on the subject of forest conservation in the past decade, and particularly during the past three or four years; so many general suggestions for better methods of conservation have been put forward; so many conferences have examined into and reported upon conditions,—that it is manifestly impossible for this Commission to deal with the subject without some repetition of data previously presented. We are strongly of the opinion, however, that it is only by constant reiteration of these fundamental truths, that the principles underlying proper forestry practice may be impressed upon the public mind with sufficient force to impel action on the part of the government of the day.

Too often, the term "forest conservation" is interpreted as something which might be considered as a fad,—something altogether too idealistic to command the attention and respect of the practical man in this western hemisphere. This condition arises from the fact that many persons, having been inspired with concern for the national welfare, but without a very practical knowledge of the subject with which they were endeavouring to treat, have made proposals which were entirely beyond the realm of practicability. If principles of conservation are to be applied in this country, they must be principles which have basis, not only in science, but, also in sound business economics. The Commission is firmly of the opinion that forest conservation is a sound business practicability in Canada, and in the ensuing remarks consistent effort will be made to demonstrate our position in this regard.

Until comparatively recent years it has been the boast of Canadians that our country was one of 'inexhaustible forest resources.' Even to-day, there are men prominent in business, professional and political life, who, lamentably ignorant of actual conditions, are prone to the utterance of expressions of satisfaction with and reliance in the extent of our forest supplies. There are still to be found districts where the presence of timber is considered by the local people to be a barrier to development,—a repetition, in newer localities, of the condition which applied at the time the pioneers settled the St. Lawrence valley and southern Ontario. Again, timber operators have, for several generations past, been striving, under the conditions of severe competition which obtain on this continent, to convert standing timber values into legal tender, while they, and the public generally, have lived in unjustified security in the mythical timber supplies presumed to lie beyond. Coincidentally, fire, insects and fungus diseases have been taking severe toll of our forest supplies. These several factors, and erroneous beliefs arising out of them, have contributed, more than anything else, to ignorance and misunderstanding on the part of the people generally. It is high time that these misconceptions were dispelled.

The time has most assuredly come, when, if Canada is to continue as a producer of wood commodities for the world markets, we must take cognizance of conditions as they actually exist in this country, and apply economic methods

in the conduct of our forest business. During the period of our development we have, to a great extent, dissipated, or permitted to be dissipated, through fire, insects, decay, and in a measure by wasteful methods of exploitation, a forest estate which, properly handled, would have placed, and which if now properly taken in hand, still may place Canada in the forefront as a supplier of timber and timber products, more particularly of the coniferous or softwood species.

✓ The one factor in the forest which renders feasible the rehabilitation of our forest estate, is the power of regeneration and of continued growth. In past control of the forest property, these powers, or the full possibility of these powers, have in greater degree been neglected. To use an analogy, we have, in our unjustified conviction of inexhaustible supplies, left our forest capital in current account, failing almost entirely to take advantage of its capacity to earn interest; we have been and still are failing to properly husband and protect a resource in the same manner which any sound business man applies in the profitable use of his most valuable asset. In many instances we have treated the forest resource in the same manner that many of the early settlers in this country and in others have treated the land,—allowed it to become impoverished to such an extent that it cannot be expected to produce profitable and continuous crops unless steps are taken to re-establish the conditions which are essential thereto.

This neglect to treat the forest as a crop has been characteristic of forest administration on this continent, as it has during the pioneer periods in other parts of the world. Consideration of the forest as a crop is, however, a stage which must be attained by every country which hopes to maintain proper economic equilibrium between production and consumption of natural products of the soil. One may look to the more densely populated regions of Europe where the lessons of forest improvidence were learned sixty, eighty or even a hundred years ago, and where, by the application of rational forest practice, what would appear to us on this continent to be almost ideal conditions, obtain; or one may turn to India where, seventy years ago, a forest estate, well-nigh ruined by the traders, was taken in charge, and where, through the ensuing years, by the application of rational methods, a national estate of enormous proportions has been built up, with a current annual revenue of some three million pounds sterling, rapidly increasing.

While, as a result of its investigation, the Commission does not consider the present as a time for despair or for the application of panic methods, we do believe that it is essential to national progress that better methods of forest conservation should be applied in Canada. We do not believe that it is necessary to adopt theoretical measures or to consider the hoarding of timber supplies.

✓ We believe that the term "conservation", as it ought to be applied, means the liberal but careful use, for the benefit of the present generation, of mature timber as it may be required in domestic consumption and for foreign trade; consonant with that, however, is our belief that the protection and development of immature timber is a most essential element of conservation,—necessary not only to provide for future generations but essential even to the present one, in that it will directly build up a confidence in this country, as one of permanency in forest industries, to the end that further capital may be encouraged to seek investment here. Although there are other economic factors which at present retard the flow of capital to forest industries in Canada, there is most certainly no single factor, and probably no group of factors, which would more surely and more rapidly inspire confidence, and ensure an influx of foreign capital, than would the adoption of a progressive forest policy. When our systems of forest management become such that the forests are handled on the basis of sustained yield, and when adequate protection is given, then will additional capital seek permanent investment here.

SESSIONAL PAPER No. 310

By the term "forestry" is meant the management of timber lands in such a manner as to provide successive and continuous crops of timber of the kind and size required by the uses to which it is to be put. The methods to be applied may vary greatly in their intensity and cost. The more scarce that timber may have become in any country, and consequently the more valuable, the more intensive and costly may be the methods applied in management and development of the forest. Conversely, in a country where supplies are more plentiful, and wood consequently cheaper, the more extensive and less costly must be the methods of regulating the forest. In all cases, however, the principle of cropping timber, crude though the method may be, is essential before it may be stated that the practice of forestry is being applied.

It is now thoroughly recognized in all civilized nations where forests constitute any considerable part of the national estate, that the formulation of an adequate forest policy is definitely a function of the State. Although in some countries private forestry practice has been the forerunner of a broader national policy, it has pre-eminently been the experience of nations that private forestry cannot serve the full requirements of national welfare.

In agriculture, the state may lay out a programme of educational work for the guidance and advice of citizens, and may depend for actual agricultural development on the efforts of private individuals; active participation by the state in agricultural practice may be more or less confined to experimental demonstration and research work. This limited activity in agriculture, by the State, is sufficient only by reason of the fact that the returns from agriculture come frequently, and, with most crops, are secured within the space of one year or season; the returns are large, and give the farmer, in addition to a considerable portion of his food supply, a very fair return for his labour, and on any capital he may have invested. The pursuit is, therefore, one which appeals to private endeavour.

Similar conditions do not obtain in the practice of forestry. The time element is a serious one, and returns in the form of a forest crop are deferred for at least one, and more probably two or three generations, after the reproduction of a stand of timber takes place. Moreover, considered on the basis of normal prices of forest products, the financial returns to be secured are by no means so attractive to the individual, even if it were possible for him to reproduce his crop and reap it during his own lifetime. Furthermore, due to the long period through which the forest must go before it can be harvested, and to the many things which may happen during that period—fire, insects or fungus infestations—forest practice is attended with such hazards that to the private individual it is not, after all, very attractive.

So far as the production of wood crop is concerned, private forestry practice on this continent is to all practical purposes confined to (1) corporations that absolutely depend on a continuous supply of timber over an extended period of time, to protect heavy financial outlay in mills and equipment; (2) owners of large estates which are to be retained in a family from one generation to another, and who feel a sense of responsibility in leaving the forest estate unimpaired, perhaps improved; (3) philanthropists or persons who may financially be able to carry it on as a hobby; and (4) farmers, or others, who having small woodlots on their holdings, may actually put into effect some system of management which may bear indications of elementary silvicultural practice. Of the four classes referred to, it may readily be seen that only in the case of the permanent corporations is it at all probable that any extensive programme of forestry might be carried out. Naturally, the corporation manages its timber holdings with one object in view, namely, the production in the quickest possible time of the particular class of wood product it requires. There would be no

justification, therefore, in anticipating that a comprehensive national forest policy could be developed solely through the activities of private corporations.

From the standpoint of making available to its citizens a continuous supply of forest products, it is essential that the State itself should formulate and execute a policy which will give adequate results. Moreover, by reason of the climatic influence of forests, and their effect on water supply and in the regulation of stream flow, the State must shoulder the main responsibility for the protection and development of the forest resources.

CHAPTER II—THE ECONOMIC USE OF LAND

In all civilized parts of the world it is now thoroughly recognized that it is essential to economic development and national safety that a country should maintain an appreciable part of its area under forest cover, and that there should be produced locally a considerable part of the requirements of timber products. The soundness of this principle has been abundantly demonstrated in European countries, where, notwithstanding density of population, and the consequent demand on the land for other purposes, there are now definitely maintained under forest cover large percentages of the land areas of the individual states. The fallacy and the danger of neglect in this respect was clearly demonstrated in Great Britain during the late war; as a result, Britain has embarked upon a sound and extensive policy of rebuilding her forest area.

The extent to which forests are maintained in some of the important European countries is indicated in the accompanying table. Two points, referred to above, stand out very clearly; (a) the low percentage of forest land in Great Britain, as compared to other countries, explains and justifies her present constructive efforts to increase the forest area; (b) that Belgium, Finland, France, Alsace-Lorraine, Germany, Norway, Poland, Russia and Sweden, all of which are favourably situated to compete strongly against the American continent in the supply of forest products in Europe, retain relatively large percentages of their land areas under forest cover, particularly when density of population and the consequent demand upon land for other purposes are taken into consideration.

SOME FOREST AREAS IN EUROPE

Country	Forest Area in acres	Percentages of Total Land Area
Austria.....	7,600,000	37.7
Belgium.....	1,321,240	13.2
Finland.....	49,410,000	60.0
France.....	24,420,150	18.4
Alsace-Lorraine.....	1,088,270	30.3
Germany.....	30,905,840	23.8
Great Britain and Ireland.....	3,315,200	4.3
Norway.....	17,037,570	21.4
Poland.....	21,881,140	22.8
Russia.....	440,000,000	33.7
Sweden.....	55,550,000	54.8

Taking Europe as a whole, the total area under forest is 774,118,460 acres, comprising 31.1 per cent of the total land area. In Canada, excluding Prince Edward Island, the Northwest Territories and the Yukon, where timber resources are either relatively inconsequential, or so inaccessible that they do not affect the general situation, we have a forest area of 1,216,408 square miles (778,501,120 acres), or nearly 60 per cent of the land under consideration. Of this, however, 775,748 square miles (496,478,720 acres) is unmerchantable or

SESSIONAL PAPER No. 310

inaccessible forest, so that the area from which supplies must for many years be drawn is in the neighbourhood of 20 per cent of the land area. True, our population is small, but allowing for consistent increase, it should be our aim, with the resources at our disposal, to continue a large net export of forest products. It must also be kept in mind that as against a per capita consumption of only 35.8 cubic feet, in Europe, our per capita consumption in Canada is 285 cubic feet.

Of the countries listed in the table, Austria, Finland, Norway, Poland, Russia and Sweden are net exporters of wood products, and of these, Finland, Norway and Sweden are cutting in excess of their annual growth in order to maintain export trade. In still other parts of the world, also, experience has clearly demonstrated the necessity for maintenance of the forest. India maintains under forest cover 22.7 per cent of her land area; Japan 53.3 per cent; Asiatic Russia 29.3 per cent; United States 28.9 per cent; and New Zealand 25.7 per cent. All of these facts, indicative of the experience in other countries, clearly point to the necessity of permanently maintaining in a productive condition the forest area of Canada.

In countries of limited land areas and dense population, it is frequently necessary that land quite suitable for agriculture should be devoted to timber production, in order that proper equilibrium should be maintained. In other countries, where land areas are great and populations relatively small, such a condition does not as a general rule exist. One characteristic of timber growth is its ability to thrive on the poorer soils which cannot possibly support profitable agricultural crops. While, manifestly, timber may be grown more rapidly on the better soils, still, so long as climatic factors are not unfavourable, so long as lack of drainage does not prevent, and so long as the surface has not been entirely robbed of its soil cover, timber may profitably be grown. Rough topographic features frequently prevent absolutely the production of agricultural crops on areas where timber may be successfully grown.

It is into the latter category that Canada falls. With a land area of 3,603,336 square miles, and of this area over 75 per cent entirely incapable of producing profitable agricultural crops; with a population of only eight and three-quarter millions; with a very considerable part of the non-agricultural areas quite capable of growing excellent timber,—there is no need, as a general policy, to use agricultural lands for timber production. It is true that, even in Canada, there are advantages to be gained by the use of limited areas of agricultural land for this purpose, for the farm woodlot, for shelter, or for aesthetic purposes; in the main, however, and for the assurance of a continuous supply of timber, there is no necessity of permanently dedicating to forest production lands which will yield greater money return in agricultural crops. Even in the country to the south, United States, with a population of twelve or thirteen times as great, the use of agricultural lands to maintain the timber supply is not necessary as a general policy. For this continent it may truly be said that, providing true forest lands are properly protected and developed, there need be no conflict whatsoever between agriculture and forestry interests; indeed, the two are essential one to the other, and both of them the fundamental basis of national development, progress and safety. To over-development of agriculture and allied pursuits, and to neglect in recognizing the necessity of forest cover, are attributed the decadence of several countries, once wealthy and productive. Even in Canada and the United States notable examples are to be found of regional decadence and penury resulting from denudation of forest lands which were primarily unsuited to agriculture.

The realization of these facts by the people of Canada will result in a proper conception of what forestry is. It will at the same time remove some entirely erroneous ideas as to there being a basis for conflict between agriculture

and forestry. It may well be reiterated that, broadly speaking, there is no necessity for using truly agricultural lands for the production of timber for this or for succeeding generations.

Aside from their value in producing timber for use, there are many instances in which forests must be maintained for the protection of watersheds and the regulation of stream flow. Discussion of this phase of forestry is not within the scope of the present enquiry, except in so far as protection forests, as they are called, may also serve as a source of supply of timber for use as saw timber, pulpwood, mine props, fuel, etc.

CHAPTER III—LAND CLASSIFICATION

The remarks in Chapters I and II clearly indicate that there must be a division of land into the agricultural and non-agricultural, in order that each may be assigned to its proper field of use. Some definite and systematic process must be undertaken to properly segregate lands in the two classes. Neglect to do that has resulted in the abandoned farms and settlements in various parts of Canada and other countries, on the one hand; and, elsewhere, in the degeneration into desert wastes of lands that at one time supported excellent stands of timber. Although in democratic countries it is difficult, if not impossible, for governments to adopt extreme methods of paternalism in the settlement of lands, it is everywhere fundamental to a successful settlement policy, that settlers should be prevented, so far as possible, from taking up lands which are known to be of insufficient agricultural value to support them. In every province of Canada are found glaring examples of indiscriminate and injudicious settlement. Too often the effort has been "anything to get another settler in a district,—another taxpayer and school supporter". If a mistake is made by the individual settler, it is considered to be entirely his own fault. Such haphazard policies have resulted in many ignorant failures, and also in fraudulent use of natural resources.

If the "breaking" of a misguided settler were the only consequence of such hit-and-miss policies, the situation would be bad enough; when, however, the breaking process is accompanied by the partial or complete destruction of adjacent resources—frequently the case—the fault is greater a thousand-fold. A settler, unintelligent enough to select a piece of land which is incapable of supporting him, may hardly be expected to exercise any better judgment in treatment of other resources which may exist in the district. There is, therefore, a very definite responsibility, upon the part of governments, to guide in some manner and to some extent the settlement which takes place.

If it be accepted that agriculture and forest production are essential to proper economic development, it is axiomatic that their greatest development can only take place if conditions for each pursuit are rendered as favourable as possible. As above brought out, fundamental to this is the classification of the lands of any region into the agricultural and the non-agricultural. On this continent, it is only within very recent years that really serious thought has been given to this basic requirement. Even more recent, have been any serious practical attempts at systematic land-classification; and strange though it may appear, such efforts have been initiated, not so much by the land organizations which really should bear the responsibility for rational settlement, but more frequently by other agencies who have had before them some definite and limited settlement problems; or, by still other agencies which have suffered greatly as a result of the antiquated and haphazard methods of unguided settlement. Only now, is there becoming evident some appreciation of the necessity for the application of principles underlying land-classification.

SESSIONAL PAPER No. 310

Land-classification is a process which, for lands under control of the federal government, should be placed immediately in general effect; a process that should be developed and fostered by the federal authorities for use in the provinces; a process which should without further delay be applied in each province that controls its own land problems. It is not for a moment argued that a government, provincial or federal, should project itself into extremely paternalistic measures which would relieve the settler of all his responsibilities in selecting land. It is incumbent upon governments, however, to go a very great deal further than they have yet gone, to prevent in every possible case the irrational settlement that frequently occurs on non-agricultural lands, and to encourage proper settlement by the acquirement and correlation of information regarding lands which may still be available.

In the province of Nova Scotia the great bulk of the land area has already been alienated in fee simple. At the present time, it is a rarity to dispose of government land for settlement, as the good or fair land has long since been disposed of. Under such circumstances, the belief may be engendered that, although in earlier days a system of land-classification would have been of inestimable value, the fact that the land is nearly all disposed of would render entirely unnecessary a system of land-classification. Such a conclusion is entirely erroneous. In that province, land-classification, and treatment resulting therefrom, is the only means by which the weaknesses and mistakes of past methods of settlement may in part be rectified, and plans developed to return the lands of that province to their full state of productivity whether in forest or field crop.

In New Brunswick, evidences of faulty settlement abound; much of the land has been alienated, but a definite system of land-classification is under way for the balance of the Crown lands. In Quebec, a much smaller proportion of the provincial area has been settled. It appears that steps are now being taken to control settlement by application of the principles of land-classification. In Ontario the situation in many ways resembles that in Quebec; there is a great similarity in settlement problems of the two provinces. Here also, the control of settlement by preliminary land-classification is all-essential. Both in Ontario and Quebec, conditions are such that in many districts the general or extensive segregation of lands into two classes is a relatively simple matter. There is nothing but condemnation for a policy which would jeopardize the safety of large areas of valuable timber supply for the purpose of establishing a few isolated settlers. Particularly in Quebec, the promise of more carefully restricting settlement to areas of known agricultural value, is one which constitutes a most important step in the right direction. The day is far gone when we may gamble millions of feet of merchantable timber, or thousands of acres of young forest growth, against the pittance which a handful of isolated settlers can contribute to the national wealth. ✓

In the Prairie Provinces, the land problems are perhaps not so intricate, by reason of the fact that there exist in the south vast expanses of land essentially agricultural; even there, however, a certain amount of land-classification has been necessary. In the more timbered regions to the north, work of this character is of utmost importance, and, where it has not already been performed, should precede further attempts at colonization. The land-classification work which has been carried out by the Topographic Surveys Branch, Department of the Interior, merits special commendation. The greater development in, and more extensive application of, this kind of work, will ensure results in settlement vastly superior to those which have been in evidence heretofore. Further, work of this character, carried out by the federal government may serve as an excellent example to the provinces that have similar problems to deal with.

In British Columbia, by reason of the rugged nature of the country, land-classification problems are not so difficult, and the area requiring treatment in this manner is relatively small as compared to other parts of Canada. In great measure, nature has classified a large part of the area as absolutely unsuitable by soil and topographical conditions to agricultural pursuits. Even in this province, however, many classification problems present themselves for solution.

Generally for Canada, it will be seen that future settlement should at least be preceded by the extensive classification of lands which have not been dealt with in that manner; and that there are cases, even in parts of regions already settled, where a classification should be effected, if the land resources are to be brought either by public or private enterprise to their full state of productivity. Wherein lies the national, provincial or community gain, in the settler who cannot sustain himself on land which he may have chosen, or upon which he may have been permitted or even encouraged to settle?

CHAPTER IV—THE DEDICATION OF FOREST LANDS

Broadly speaking there are, after all, only two main purposes for which large areas of land may be used, namely, in agriculture and in forestry; use of the productive characteristics of the soil are also confined to these pursuits. Undoubtedly there are other uses for more restricted areas, particularly in mining. Mining, however, is not dependent on productivity of the soil, but upon the formations which lie in or beneath it; and inasmuch as the mining of areas carrying rich deposits can be carried on, and to a greater extent is pursued on true forest lands, in view of the fact that this may be done without serious detriment to the forest, it is therefore quite sufficient, in a general scheme of land-classification, to confine ourselves to two main classes,—agricultural and forest lands.

An effort has been made in Chapters II and III to show, in the first place, that lands should be assigned to the uses for which they are best adapted; secondly, that to permit of so doing they must be subjected to a process of classification. Upon completion of the latter operation, an excellent beginning has been made, but several further steps are necessary if the lands classified as forest are to be maintained in a state of profitable productivity. For agricultural lands, further procedure is pretty well confined to the enforcement of settlement regulations; beyond the application of consistent effort, upon the part of governments, to properly guide settlement, further action may pretty well be left to individual and private effort. Forest lands, on the other hand, must be accorded entirely different treatment. It is of utmost importance that forest lands should, for the purpose of economic management and development, be definitely reserved under conditions which prevent the alienation of any area primarily suitable for forests, except for reasons consistent with the forest policy as a whole. Having decided that a certain tract is primarily adapted to forest production, it is of transcendent importance that it be dedicated permanently thereto by statutory legislation.

It is manifestly essential to the production of any crop that the area on which it is to be grown should be definitely assigned to that purpose for the life of the crop. It matters not whether the crop be of oats, potatoes, or anything else, success can only be attained by the exclusive use of the tract for the entire period required for the seeding, growth and harvesting of the crop. Similarly, timber being a crop, if it is to be successfully grown, the land must be definitely reserved for that purpose. There is only one known method by which public land may be securely reserved, namely, by the creation of statutory national forests, forest reserves, or whatever they may be called. Experience throughout the world has shown that the practice of simply preventing settle-

SESSIONAL PAPER No. 310

ment upon such lands, but without taking any further steps for their dedication, cannot serve to the full the purposes for which such lands are intended. For proper development certain measures have to be effected if timber land is to be successfully handled, and all of these requirements call absolutely, and without any question whatsoever, for statutory reservation.

There are many who argue that statutory reservations are not necessary, and that mere provision for the exclusion of settlement will fully meet the requirement. To meet such an argument it is perhaps only necessary to state that, when a period of one, two or three generations is required for growing of the timber crop, there must be assurance or guarantee against changes in policy for that period. An area permanently dedicated by statute to forest production naturally enjoys security from tampering with the policy upon which it is based. If, during the course of the period required for the production of a crop of oats, a farmer were continually changing his mind as to just what he would grow there, or the methods under which he would grow it, there would be small chance of his obtaining a successful crop of any kind. Precisely the same thing applies to the timber crop; as a matter of fact, due to the long time necessary for its development, there is much greater liability to frequent changes of policy which are absolutely inimical to the attainment of maximum or even average results; and it is partly to offset this predisposition to tampering, that permanent dedication of forest lands is necessary.

By way of explanation let us first of all consider the individual, or the public. If there is one thing necessary in this country, it is to demonstrate to, and convince the people of, the aims of forest policy. If no action be taken for the creation of statutory forests, what is more difficult for the isolated settler to understand, if a mile, two miles, or ten miles from him there is a large area of forest land which, although it may be reserved against settlement, is not the subject of more complete reservation? While he may be informed that it is not suitable for settlement, it nevertheless lies there in more or less dormant state, no action being taken toward proper development of it. This engenders in him a prejudice, frequently amounting to animosity, toward the policy, simply because the policy is in itself neither definite nor concrete. On the other hand, from the time the forest reserve is created and placed under development, whether the settler may at first like it or not, he has, nevertheless, placed in front of him, some definite tangible action, the aims of which are at least obvious. He knows, moreover, that before he or anyone else can alter the policy, a considerable amount of elaborate procedure is required. In these circumstances, he is less liable to interfere with the area so reserved; indeed, it may arouse his resentment should any other person attempt to do so.

It has frequently happened that, even after a proper classification, large areas of true forest land have been allowed to remain subject to settlement regulations, the only preventive against unjustifiable settlement being the provisions of land settlement regulations. Experience has thoroughly demonstrated that the restricting features of a settlement act will not of themselves satisfactorily guide settlement. Times without number, such superficial treatment of unreserved forest lands has resulted, firstly, in the incoming of ignorant settlers who entertain hope of securing a livelihood on the inferior land; secondly, in the ingress of the bogus settler, who enters the forest, not with the idea of making a farm for himself, but purely for the purpose of taking out what timber wealth there may be available, and later abandoning the area to repeat his fraudulent practices elsewhere.

Exemplifying further, the danger of leaving true forest lands unreserved, it may be pointed out that there have been very numerous instances where communities or municipalities, desirous of establishing school districts, or entering upon other municipal ventures, have urged that lands absolutely non-agricultural

in character be made available for settlement. This is an extremely short-sighted and very dangerous policy; the only purpose which it can possibly serve is in allowing misguided settlers to go on the land, and to have them appear as potential taxpayers—only temporarily, however. Although the existence in a certain district of a certain number of residents may be a basic requirement to the establishment of a school district, or some other undertaking of this character, the benefit of this class of resident is short-lived; so long as the land made available to him is incapable of successful agricultural development, it is utterly impossible that he should develop into a taxpayer, or in any other manner serve the advantage and responsibilities of the community.

Generally speaking, the public takes a great deal more interest in something which is definite than they do in something which lacks decision. It is true that past experience has shown that, in some districts where the formation of forest reserves was undertaken, there was at first a certain amount of unrest among the people in the vicinity. A comparatively short time after the creation of such reserves, however, and upon the upbuilding of the personnel and facilities for the administration of such reserves, people have realized that something definite—something which would redound to their own advantage, immediately, or at least ultimately—was being done, and some definite purpose was being attained. This has resulted in an entire change of attitude on the part of the people, and in many parts of Canada the forest reserve has become a very permanent and thoroughly accepted fixture in the domestic life of the people.

Viewing the matter from another angle, namely, from the standpoint of forest industry,—we have surely seen enough, too much, in fact, of the migration of industries from place to place. In Nova Scotia, New Brunswick, Quebec, Ontario, and clear across to the Rocky Mountains, we have witnessed the exhaustion of timber supplies accessible to forest industries in various districts. We have seen industries modify or completely change their programs; in many cases we have seen them move elsewhere, in order to overcome the difficulty of securing raw materials at close range. While it may be relatively a simple thing for a small portable sawmill to move about from place to place, seeking its wood supplies, it is a vastly different thing to consider the migration of the pulp industry, for instance, or, as a matter of fact, of some of the present large-scale sawmills; such huge sums of money are invested in these plants, and the process of moving would involve such great economic loss, that it simply must be prevented by some means. The only means by which it may be prevented is by the assurance of continuous supplies of raw materials at, or within reasonable reach of, points where they are located. This permanent supply can only be brought about by the permanent assignment of forest lands to timber production and the proper management and development of such lands to that end.

If it is necessary that special laws should be enacted for the guidance and control of persons engaged in agricultural pursuits; if it is necessary that, in urban communities, laws should be provided for the protection of individual and municipal rights; it is just as necessary that special legislation should be promulgated for the protection and development of lands which are to be permanently assigned to timber production. Very naturally, as special laws are required, the legislation must be applicable to specific areas, and those areas must naturally coincide with the districts which have been determined upon as being required for forestry purposes; that is to say, the forest law itself must delimit the areas to which it is to apply.

Moreover, an organization which is responsible for timber administration must necessarily operate under legislation which contributes directly to success of the undertaking. The proper protection and development of forest lands requires the construction of improvements and the provision of many other facilities for the carrying out of various phases of forest management. So long

SESSIONAL PAPER No. 310

as uncertainty exists as to actual definition of the tract under forest management, it is impossible to formulate and put into effect a concrete plan of improvement work. No forest area can be properly handled without the expenditure of money for such improvement work, and necessarily the expenditure of such limited funds as are obtainable by the services in this country must be applied where they will be of permanent value. One of the greatest economic wastes which occurs in forest expenditure in this or in any other country lies in frequent changes in improvement plans, due to altering circumstances surrounding land status. If, therefore, a comprehensive protection and development plan is to be effected for a forest tract of, say, a million acres, before expenditure on such plan is justified, it is of paramount importance that the organization which bears the responsibility for the carrying out of such plan should have unhampered and continued control of the area with which it is to deal.

Finally, one of the greatest difficulties in development of adequate and efficient forest services in this country, and in all others, lies in the building up of permanent personnel. If, therefore, a service has not full control of all activities taking place within the forest area, it is frequently impossible to develop the permanent skeleton staff which is so essential to success in forest protection operations. To make this point clear it is only necessary to cite the case of a well organized forest reserve, where a staff is maintained throughout the year—in the summer engaged largely in fire protection operations, in the winter carrying on those phases of forest activities relating to timber utilization—and to compare with the latter an unorganized forest area where, during the course of the fire period, it is necessary to carry a large seasonal staff, but where, during the winter months, there is insufficient work to justify the employment of a sufficient percentage of the staff to constitute the permanent skeleton force so essential in forest protection activities.

In municipal fire protection experience has shown that it is absolutely necessary to maintain a permanent trained force, and to provide highly specialized equipment—both ready at all times, upon the call of fire. In such cases, it is entirely doubtful that more than a small proportion of the time of the fire staff is actually expended in constructive work, but this non-effective time must be paid for in order that the highly concentrated values of town properties may receive adequate protection. In forest protection, it is just as essential that the feature of permanency should apply to a part of the organization; it is furthermore, necessary that the field of activities of such an organization should be defined. The only manner in which these results may be properly attained is by the definition by Statute of areas which are to be placed under protection.

To be successful a forest policy must be continuous. Success cannot be attained if, with each succeeding administration, or even at longer intervals than that, there are going to be readjustments in area which may partly or entirely upset the plans for administration. It is here considered necessary to point out that it is generally the case that the objections from time to time raised against the creation of forest reserves, are more frequently based on entirely false premises. The very expression "forest reserve" is one which has frequently given rise to misconceptions, and for this reason the Commission is strongly of the opinion that the earlier the use of the term is discontinued, and a better one adopted in its place, the sooner there will be removed from the public mind some of the uncertainties which now exist. A large part of the population conceive a forest reserve as being an area where timber is reserved from present use, for the benefit of future generations. As a matter of fact, there are some forest reservations in this country to which this condition seems to have been applied, but this is not generally the case. As has previously been pointed out, the term "conservation" involves the use, for the advantage of the present generation, of all timber which matures during its time and which is necessary for

domestic consumption or for export trade; along with that, however, the reproduction of the timber must be secured and the young stands protected against fire and other depredations, so that the forest area may be made to yield continuous crops of timber for this and succeeding generations.

There has frequently been misunderstanding between different governments, and between various departments of the same government, as to the aims of the forest policy in the creation of forest reserves. If it be thoroughly appreciated at the start that, in this country at least, there is no necessity for the use of any extensive areas of agricultural lands for timber production, and that the policy of every forest service in this country takes full cognizance of that fact, a great many of the difficulties which have arisen, and a great many of the petty disputes which have occurred, would entirely vanish for lack of any substantial economic basis.

Owing to the long period required to produce the timber crop, and by reason of the fact that the annual harvest must be confined to a relatively small part of the forest tract, large areas are necessary for the successful conduct of forest administration. Although these large areas may frequently contain small tracts of agricultural lands, the policy to be determined upon for the larger area cannot be subservient to the requirements of a limited number of isolated settlers located on these small agricultural tracts. As previously demonstrated, forest administration requires legislation entirely distinct from that applied in other pursuits, consequently, if provision be made at all for the settlement of small parcels of agricultural lands in forest districts, these provisions must take full cognizance of, and be made amenable to, the requirements of the forest policy for the entire area. Frequently it has occurred that, after the classification of considerable areas as true forest land, land departments responsible for settlement policy have taken strong objections to the creation of forest reserves, on the ground that small areas of agricultural lands had been included. Too often, this has resulted in delay in the permanent dedication of forest lands to the purpose for which they were by nature intended. If a district or region consists essentially of true forest land, it should, without delay, be permanently dedicated to forest production; if necessary, and if it will not prove abortive of the principles underlying the forest policy, small areas of agricultural land may later be eliminated, although the conditions under which they are so eliminated, and their subsequent treatment, must be made to harmonize with the forest policy.

While, in certain parts of Canada, notable progress has been made in the permanent dedication of forest land, by the creation of forest reserves, etc., the placing of the forest estate on a basis which will render it susceptible to proper management absolutely demands that there be a vigorous acceleration in this process of dedication. Absolutely nothing is to be gained, and a very great deal is to be lost, in retaining in a state of unproductive suspense, large areas of land which are suitable to no other purpose than the production of timber. As previously pointed out, such a state of dormancy encourages the illegitimate settlement and fraudulent use of timber resources.

In the province of Nova Scotia, no forest reserves or provincial forests exist. As has previously been explained, the forest resources, both timber and soil, have in a large measure been alienated. The Commission, however, strongly urge the position that those remnants of the forest which still remain in the hands of the province should receive definite examination, and wherever there are opportunities in that direction they should be considered as the nuclei of permanent provincial forests, which from time to time may be extended by the acquirement of adjacent lands as the opportunity for purchase offers. The Commission are reliably informed that from time to time opportunity is accorded for the purchase, at very low cost, of lands which, although now more or less

SESSIONAL PAPER No. 310

denuded of merchantable timber, either bear young growth or are still quite capable of producing a new crop of timber. In a province where absolute forest land comprises such a large part of the total land area, about 70 per cent; in a region where forest industry plays such a large part in the economic and industrial life of the people,—it is surely incumbent upon the State to play a much more active part in that pursuit which is fundamental to the continuance of such industry, namely, timber production. The experience in this province has abundantly demonstrated that private industry cannot be depended upon to play the leading part in forest conservation and timber production, and under such circumstances, the time has most certainly come when the state itself should make a beginning in the management of forest land, if only to point out the way, and to provide the incentive, by which the private owners may realize that a piece of timber land has potentialities far greater than those represented in timber now available.

In New Brunswick, although there are as yet no forest reserves, the province still retains title to about one-half of the forest area, and during the past seven or eight years has engaged in the systematic examination and classification of such land. Under these circumstances, it is only necessary to strongly urge that a definite policy of forest reservation be inaugurated for such districts where the classification has been completed, and that areas which justify permanent assignment to forest production should by statute be dedicated as provincial forests. The tendency in that province has been perhaps to delay action until the classification is completed, but it is forcibly suggested that such a delay is both unnecessary and perhaps dangerous. That forest industry in that province is even now in a very serious condition, insofar as future timber supplies are concerned, merely accentuates the necessity for the establishment of permanent forest areas.

In the province of Quebec, although at different times large areas have been set aside as forest reserves, it has frequently been the case that these were not preceded by a proper classification. More frequently, also, such reserves were merely established by Order in Council, with the result that the conditions under which the reserves were created left them very susceptible to reduction without the necessity of recourse to legislative enactment. In other words, from many of these reserves large eliminations can at any time be made by Order in Council. More recently, however, the government of that province has engaged itself with the creation of smaller reserves which have a definite aspect of permanency. It is strongly urged that this latter feature should in future be permitted to play a much more prominent part in the legislation under which forest reserves are set aside.

In Ontario a much more limited area has been set aside as forest reserves and parks, but the legislation under which they were created is much more definite, and does not offer such freedom in withdrawals as is the case in Quebec. In some of the reserves, at least, there has been a tendency to withhold mature timber from disposal on the grounds that the forest is required for the preservation of scenic attractions which the reserves offer. In the Timagami Reserve, for instance, the tendency toward restriction in the disposal of timber has been very pronounced, with the result that there is a strong feeling in the public mind that the timber resources of that area are entirely prohibited from use.

On provincial lands in British Columbia a beginning has been made in the creation of forest reserves for watershed protection in the dry-belt country. The Forest Act under which this province operates is an excellent one, and it only remains to apply in their entirety the provisions of, and the principles underlying, that Act, and the province will ere long have permanently assigned to forest production those areas which are primarily adapted to that purpose.

Although in numerous cases forests are very essential for watershed protection, their main use is in producing timber, and their permanent dedication is just as necessary for this purpose, as it is for watershed protection.

Without question the most consistent and most continuous policy for forest reservations in Canada has been effected in the Prairie Provinces, and the Railway Belt of British Columbia under the auspices of the federal government. In the British Columbia Railway Belt the area of forest reservations approximates $1\frac{3}{4}$ million acres, comprising 15.6 per cent of the total area. In Alberta the forest reserves include almost 12 million acres, comprising 7.35 per cent of the provincial area; large areas of forest land are also included within the Dominion parks, bringing the total area of reserved forest in the neighbourhood of 10 per cent of the provincial area. In Saskatchewan the area of forest reserves is 5,900,000 acres, comprising 3.7 per cent of the provincial area. In Manitoba 2,500,000 acres have been permanently reserved, comprising a little less than 2 per cent of the provincial area.

The areas referred to in the foregoing paragraph as having been created forest reserves by Dominion legislation have been placed under a definite system of protection and development. To a greater extent the boundaries of such reserves have been demarcated, and, over the district in which they occur, the federal service and the people of the surrounding country are dealing with something which is tangible and definite. Although necessarily they must from time to time be subjected to minor alterations, these reservations are absolutely of a permanent character and will continue as such. With the exception of the dry-belt portion of the Railway Belt, however, (and not altogether, there) the necessary forest reservations have by no means been completed. Taking as an example, the Prairie Provinces, and considering for the moment the statistical data brought out in Chapters 6, 7 and 8, Part I, of this report; recalling, also, the proportional areas permanently dedicated to forest production by other countries (see Chapter II Part III) it is quite apparent that further action is required for the permanent assignment of the lands to forest production by the creation of state forests.

Taking the Dominion as a whole, and including all reservations which bear even a semblance of forest reserves—including reserves and parks, statutory or otherwise, demarcated or undefined—the aggregate is only eight per cent of the total land area. As previously implied, however, a very large part of this is under forms of reservation which are very susceptible to withdrawals; a large part of it is in the form of parks, where timber may not be exploited,—so that, the percentage of land area of Canada which may be said to have been permanently dedicated to forest production is very small indeed, almost trifling, in fact. When 75 per cent of our land area is absolutely incapable of agricultural production, what is to be done with the great margin between that large percentage and the area already dedicated? Are we to leave it in a state of hopeless indefiniteness—a sort of “no-man’s land”—absolutely unsuited to agriculture, but still unassigned to a useful purpose, when the experience of nations throughout the world clearly shows that an area percentage many times greater than that permanently dedicated to forest production in Canada, is essential to the national development and to economic safety?

Having had the opportunity to study the organizations in various parts of Canada, and having seen the marked effect which the permanent dedication of forest land brings to bear in the work of such services, in the minds of the people, and in the stabilizing of forest industry, the Commission is very strongly of the opinion that, notwithstanding the patent desirability and necessity of colonizing true agricultural lands, the processes of segregating lands in two classes is as economically desirable as it is feasible, and that the adoption and strict pursuance of a policy of permanent reservation of forest lands is one of the most important phases of forest conservation.

SESSIONAL PAPER No. 310

The existence, in this country, of so much forest land has apparently induced an attitude of carelessness or of partial indifference on the part of people, and of governments, with the unfortunate result that over vast areas the condition of our forest estate has deteriorated to a condition which calls for the most vigorous resuscitative measures, the first principle of which is permanent reservation of forest lands for the continuous production of timber.

CHAPTER V—FOREST LEGISLATION

It is not proposed at this stage to indulge in academic discussion of the details of forest legislation, but rather to lay down certain broad principles which should be observed in the framing of forest acts; also, wherever it may be necessary, to point out some of the weaknesses that prevail in legislation now existing.

There is probably no single factor which is more efficacious in the conduct of good forest administration than the existence of a thoroughly sound and comprehensive forest act. Manifestly, such an act cannot be so drafted as to contain provisions to meet every contingency that may arise in forest administration; but it is of primary importance that it should lay down, in some detail at least, the general principles which are to be observed in carrying on the forest business of the country or district to which it is to apply; to some part of such an act, it should be possible to refer any detail of administration which may arise, and to extract therefrom the guiding principle upon which decision of the isolated case must be based. The principles of the forest policy must be enunciated in a manner which leaves no doubt as to their being positive in character, rather than being merely permissive. Altogether too often, legislation of this character is framed in such a manner, and contains so many provisos, that under the pressure of political exigency multifarious interpretations, entirely foreign to the true principles underlying the act, render abortive its practical operation. In other cases, the act may be so extremely general in character as to permit the passage thereunder of regulations which are entirely opposed to the principles of rational forestry practice.

If it be accepted that the state bears a distinct responsibility in the careful treatment and proper husbanding of the natural resources to which it holds title in trust for its people, it follows that, in addition to proper use of timber which is now mature, the state must also protect and develop by every possible means within its power, that outstanding attribute of forests—the power to regenerate and re-establish themselves. In assuming responsibility for seeing that adequate supplies of timber are provided for future generations, the state does nothing that is more dutiful or more charitable than the average man who feels a responsibility in carrying life insurance for the protection of his family. In neither case is self-denial to the extent of hoarding required; but in both of them the expenditure of money, and effort is required in order that protection may be afforded.

Even in Canada, if an individual were to inherit as part of an estate, an area of particularly well-regulated timber land; and if he were immediately to strip it of its timber wealth, he would be roundly criticized for his selfishness and his short-sightedness in destroying something which it had taken many years of painstaking effort and a considerable amount of self-denial, to build up. If, on the other hand, he were to remove from the forest the amount of timber which it can annually produce, he is securing the full advantage to which he is morally entitled, and he is taking full advantage of the natural growth, to which by the laws of nature he is alone entitled. In precisely the same manner, but even to a greater extent, the state must be expected to accept, along with the natural advantages of the timber resources, the responsibilities

which accrue in the maintaining that resource as a permanently productive organism.

In the premises above outlined, the basic principle upon which the forest act must be built up is that of accepting in a full measure the responsibility for administering the forest resource on the basis of sustained yield. With that fundamental principle clearly and unreservedly enunciated, all other features of the forest act should of necessity be made to subserve that basic principle.

It has previously been pointed out that if the forests of Canada be properly handled there will be no necessity, in a general way, for the use of agricultural lands for timber production; absolutely a corollary to this statement, however, is the fact that true forest lands must be maintained in productive condition. The forest act must, therefore, provide clear-cut, unequivocal, and permanent dedication of areas already classified as forest land, and for the addition thereto of lands which, upon subsequent classification operations, are found to fall into that category. Moreover, provision must be made that alienations which are not fully consistent with the forest policy as a whole shall not be permitted. If in Canada we are to entertain any hope of renovating our forest policies; if we are to any appreciable extent to improve what is over vast areas a sadly depleted and deteriorated forest estate; if we are to permanently maintain in a flourishing condition the gigantic industry that has been built up,—we must approach the question of forest dedication in a positive and vigorous manner; we must sweep aside all the palpably trivial, albeit the sometimes ingenious, arguments that are so frequently advanced; arguments serve only to delude governments and the people, and, by obscuring the true perspective, deter them from the adoption of constructive and statesmanlike policies.

In a country which contains so much undeveloped agricultural land, what could be more foolish, more misleading, or more subversive of economic development, than acceptance of the time-worn argument that, because some large area of true forest land may contain a few small pockets of land susceptible of farming operations, the area as a whole must not be dedicated to forestry; that it must be retained in a state of desuetude, the object a desultory effort at settlement which tends toward destruction of its utility for any productive purpose whatsoever. Just as an isolated piece of non-agricultural land surrounded by fertile soils cannot be allowed to interfere with the course of agricultural development, so must the isolated pocket of agricultural land, in a district adapted by nature only to the production of timber, be made amenable to the inherent requirements of forest development. Too frequently, the natural resources of this country have been made to serve the ends of the organizations responsible for their administration, rather than the administering organization being itself moulded, modified, or otherwise reformed to meet the practical requirements of the resource with which it was endeavouring to treat. Too frequently, organizations which have well-nigh out-served their purpose have been permitted to prevent or hamper development of forest organizations, and to hinder the application of principles fundamental to proper management of forest lands. For these, as well as for the basic reasons previously outlined, it is of utmost importance that the forest act should definitely provide for the permanent reservation of true forest lands.

The question of the forest authority will be dealt with in some detail in the following chapter. It is, however, necessary to mention here that the forest act must definitely constitute the forest authority, or forest service, and must without qualification assign to it the administration of the forest area. The function of control of raw materials which serve the requirements of the second largest industry in this country is a responsibility which fully justifies the establishment of a service competent, and sufficiently extensive, to deal adequately with the problems which will confront it. Forestry problems are in themselves suffi-

SESSIONAL PAPER No. 310

ciently intricate, and require ingenious effort in their solutions, without burdening the authority with duties extraneous to the purpose for which it is created, and without hampering it with such departmental connections as may operate to thwart the principles for which it exists. By the act which brings it into being, the forest service must be clothed with the power, and provided with the machinery, essential to the conduct of its work. It must be an entity; it cannot properly serve its true purpose if it be circumscribed by considerations or connections which are foreign to the objectives of forest management.

In addition to making the provisions previously outlined,—all of which are basic requirements to the successful application of a forest policy—the forest authority must be given legislative basis for the conduct of forest surveys; this work is of such paramount importance that in most instances the forest act should definitely call for it. The authority must be both empowered and instructed to carry on forest protective operations; to manage and regulate the forest in such a manner and under such methods as will attain the object of forestry practice—sustained yield; to carry on all other activities which are related and essential to the forest conservation program which may have been decided upon. Obviously the details of all these provisions cannot very well be set out in an act requiring legislative sanction, but, as previously stated, the general authority and the guiding principles must be clearly and positively enunciated. If such provisions be adequately met, it may then be left to the service itself to formulate detailed regulations that must conform to the spirit and letter of the act. The act itself must be so formidably and securely constructed, that it will be invulnerable to attacks which are subversive of the principles upon which it is based.

In discussing legislation now existing in various parts of the Dominion, it may at the outset be stated that nowhere in Canada is there in effect a perfect forest act. Some may exhibit weakness in one direction, while others may on that particular point be sufficiently staunch. In most cases, however, the services responsible for administration of the acts are fully cognizant of existing weaknesses, and in many instances it only remains for governments to treat with a little more sympathetic consideration the representations which have been or may be made by the forest authorities.

In Nova Scotia there is in reality no forest act which may be designated as such. Disposition of such forest resources as still remain unalienated is under the provisions of a land act, and of a department which has but little active interest in, or experience with forestry problems. As will later be pointed out, there is legislation which applies, and an authority which in a measure controls, one phase of forest activity, but in so far as clear definition of a forest policy is concerned, by legislative act or otherwise, the government of that province has never expressed itself. The Commission strongly urges the necessity of a thorough review of the forestry situation by the government of Nova Scotia; such a study will of itself display the glaring need of concerted action in the framing and effecting of a forest policy in Nova Scotia.

Some years ago, the province of New Brunswick placed on the statute books an excellent example of progressive forest legislation. By the act there was created a service which, under the most trying circumstances, has endeavoured to improve conditions. Without desiring to engage in non-constructive criticism, it may be pointed out that if the Act, as such, is sufficiently definitive of policy, its application up to the present time has not been such as to arrest the serious depletion in forest resources which is taking place. The situation in this regard has been fully dealt with in Part I, Chapter III, of this report; it is sufficient to say here, that the present serious conditions call for a thorough review of the Act, and the provision of requirements which will more adequately prevent further dangerous depletion in the wood capital of that province.

More particularly in recent years, the government of the Province of Quebec has shown a disposition to attack in a constructive manner the forest problems which present themselves. The forest act contains many excellent provisions, but, as is the case elsewhere, it is well to consider whether the Act is sufficiently indicative of a concrete policy; and if so, whether such a policy is being carried out. Similarly in Ontario, notable progress has been made in forest legislation, but the question may well be put—does the Act clearly exhibit a concrete policy of forest development, or is it one merely made up of temporary expedients for the control of utilization and provision for forest protection? Putting it another way, does the forest legislation in Ontario enunciate the fundamental principles of forest policy set out hereinbefore;—or is it a heterogeneous mass of “do’s” and “don’ts” lacking clearly definition of a concrete policy for permanent maintenance of the forest resources?

Having been organized in more recent years, and having adopted the very wise procedure of “starting off with a clean sheet”, the forest service of British Columbia enjoys the fortune of operating under an excellent forest act; having, moreover, the most extensive timber resources found anywhere in Canada, the province undertakes administration of a resource which is still very far from a state of depletion. This very wealth in timber, however, has an inherent tendency to deflect attention from some of the ideals underlying rational forest practice; and in this province it may with fairness be stated that the service, in the press of administrative operation of a gigantic timber-sale business, has by force of circumstances been able to give only secondary consideration to some phases of forest policy which those in control thoroughly recognize as justifying primary consideration. Here again, we may state, careful review of the act may indicate that some important phases of the policy enunciated in the forest act have been relegated to the background owing to the pressure of other work.

Notwithstanding any inherent weaknesses which may appear in the individual forest acts of the various provinces, it may to their credit be stated that, in every case where a province has passed such an act, and created a service for its enforcement, consistent effort has been exerted, and marked success attained, concentrating to a greater extent in the one act the various aspects of forest legislation. Unfortunately the same cannot be said of forest legislation promulgated by the federal government. As will be fully exemplified in the succeeding chapter, this anomalous situation has given rise to a serious overlapping of forest authorities, and a lamentable failure in the clear definition of forest policy.

To form a comprehensive idea as to what comprises the Dominion forest policy, it is necessary to have recourse to at least three Dominion acts, and to several sets of regulations made thereunder. Firstly, there is the “Forest Reserves and Parks Act”, which makes provision for the administration of lands included within reservations of a character defined in the title of the Act. The provisions, however, apply only to those tracts contained within the boundaries of such reservations as had not been the subject of alienation prior to passage of the Act. The forest reserves section of the Act is administered by the Forest Service of the Department of the Interior, while the parks legislation is administered by the Dominion Parks Branch of the same department. Within the boundaries of both forest reserves and parks there are timber berths which were created and licensed prior to the establishment of forest reserve or park; although the work of fire control rests with the Parks and Forest services, the functions of woods management and general administration are controlled by still another branch of the same department. If the functions of timber administration and fire protection were absolutely distinct in principle and in operation, there might possibly be some hope of successful treatment of forest lands under this very objectionable form of dual control; forest protection and woods management are, however, intricately and inseparably related to each other; forest

SESSIONAL PAPER No. 310

protection cannot properly be provided unless the service responsible therefor also controls the methods of utilization. Therefore, if legislation is to be effected, it must be so formulated as to take full cognizance of this fact, clothing the service with full responsibility for all forms of forest activity.

On Dominion lands outside of forest reserves and parks—as well as on timber berths previously referred to as being included in the reservations—the legislation in effect is contained in the Dominion Lands Act. The function of administrative control of timber resources also lies with the Dominion Lands Branch, although the forest fire protection on such lands has otherwise been designated as the function of the Forest Service. Here again, and even to a greater extent, there exists the anomaly of dual legislation and administrative control in two lines of work which are entirely insusceptible of appropriate or even sensible division one from the other. There is little doubt that a great many of the present departmental difficulties arose from the fact that, because the lands of the western provinces were administered under the Dominion Lands Act, the same machinery was made use of, and still is used, in disposing of timber resources of unreserved lands. In greater measure, the regulations under which these timber resources have been and still are demised take under purview but two main considerations;—(1) the making available to industries of timber supplies, and (2) securing therefrom the revenue justified. Except in a most antiquated and superficial manner, no definite policy for the continuance on a permanent basis of the forest resources is laid down; nor is there any proper observance of the principles underlying land-classification and the subsequent assignment of lands to the use for which they are physically and economically suited. Very naturally the deficiencies of such legislation in this regard entirely fail of conviction, either within the service itself, or in the public mind, as to their being anything concrete or tangible in the forest policy, other than providing for the use of timber. The serious anomalies to which these deficiencies in legislation give rise will be more fully explained later in the report.

In view of the fact that such close supervision is maintained over the operations of railways by the Board of Railway Commissioners; in view of the general realization of the fire hazards consequent upon railway operations; and finally, in view of the urgent necessity of standardization in requirements made of companies operating in several or all provinces of the Dominion,—the fire regulations applicable to railways are in the main provided in the Dominion Railway Act, and in orders promulgated thereunder by the Railway Board. Inasmuch as such fire regulations restrict themselves to a limited and very specific field of forestry activities, and inasmuch as no attempt at interference in other aspects of forest policy can logically be made, the otherwise inherent objection to dual legislation with respect to fire is almost if not entirely removed. As a matter of fact, the Railway Commission actually enforces its legislation through the personnel of forest services already established throughout the country; no attempt has ever been made by the Board to usurp the function of actual fire control; rather, taking advantage of the powers with which it is endowed, that body has by vigorous and timely legislation furnished the machinery through which the constituted forest authorities may ensure the application of preventive measures against fire on the part of railways. The excellence of fire protective regulations, and the administration thereof, provided by the Railway Board in this regard, stands forth as a monument to the principle of truly concerted effort, exemplifying in full measure how much can be accomplished by thorough co-operation between several services, when each works to the end for which it exists, rather than considering the size, or relative importance of the individual service, as the goal of the forest protection policy. Just as it has been considered necessary to insert fire prevention measures in the criminal law of the country, to enforce attention of the individual to his responsibilities;

14-15 GEORGE V, A. 1924

and as almost any great amount of fire prevention legislation can hardly be considered as superabundant; so, the provisions of the Railway Act, and of the body which regulates railway operations, serve a necessary and exceedingly helpful purpose in the solution of railway fire problems:

After all, fire protection is not forestry; it is merely a means to an end,—to make possible the application of a policy of continuous forest production. Similarly, fire legislation may be regarded in the same light; consistent effort of every conceivable organization to bring about adequate fire legislation will not create harmful anomalies. Entirely the opposite is true, however, in regard to other phases of forest legislation; the enactment of numerous laws, and the maintenance of various services, over the same districts, for the conduct of forest administration, merely serve to obscure the policy itself, and give rise to overlapping of effort, and economic waste in expenditure of public funds. For a given expenditure in forest operations, by any government the mere act of limiting in degree the efficiency attainable, by the maintenance of dual organizations for forest administration, involves unjustifiable economic waste.

Returning now to federal legislation for forest management,—so far as parks may be necessary to serve the recreational requirements of the people, it may at once be stated that the principle underlying their creation is not based upon the necessity for timber production; provided, therefore, the areas so assigned are kept within the bounds of propriety and economic requirements, there is no objection whatever to the application of special legislation; indeed the operation of such areas requires specific treatment. The reverse is true, however, for timber lands controlled by the one government, and which are handled essentially for timber production purposes. Just as settlement legislation must be centralized in the one service, so also should timber management be centralized in the service created and responsible for that work. The legislation which voices the policy of the government must be an entity, and the carrying into effect of that policy must be centered in one authority; otherwise administration of the forest resources must remain indecisive, and must inevitably give rise to almost endless difficulties and disputes. Dual control forestalls development, and induces a state of inertia; meanwhile, the forest itself continues in a state of constant deterioration.

The question of overlapping in authority will be more fully considered in Chapter VI. It is sufficient to the discussion of forest legislation to point out that there is urgent necessity for the formulation by the Dominion of a comprehensive forest act which will clearly depict the policy of the government, and which will definitely constitute a consolidated and entire service responsible for all those phases of administration which relate to timber production and utilization; a policy which clearly displays the future of permanence, and leads to management of the timber resources for sustained yield.

Insofar as present regulations for forest reserves apply to protection and disposal of federal timber resources, they contain many excellent provisions, and show, perhaps more than any other Canadian forest legislation extant, the methods of conservation in treatment of forest lands. The one serious defect is that they apply to such a small part of the federal timber resources, and that they do not point with sufficient clarity and with adequate force to the unquestionable necessity of materially adding to the area of permanent reservations.

Obviously, it is incumbent upon the federal government to remould its forest legislation so that it may not only give effect to a substantial policy for Dominion lands, but that it may also have an exemplary effect upon other governments of the country, and encourage them in the introduction, modification, or reconstruction of their forest laws as may be necessary,—to the end that each individual forest act will not only serve the requirements of the province for which it is enacted, but that it may constitute a definite link in the broader

SESSIONAL PAPER No. 310

legislative program for the entire Dominion. Much may be accomplished toward standardization of forest legislation, but perhaps basic thereto is the realization that the lead must be taken by the Dominion. Before such leadership may appropriately be undertaken, however, the federal administration must "set its own house in order."

CHAPTER VI—THE FOREST AUTHORITY

Just as consolidation of forestry enactments in a comprehensive and thoroughly definitive Act is an essential feature of constructive forest legislation—so is the centralization in one service of all forest activities of a government a primary requisite of sound forest administration.

The forest resource is too valuable an asset to permit of the rather shiftless treatment to which in this country it has been subjected from the beginning. Upon the basis of this asset there has been built up an enormous industry, involving invested capital to the extent of 600 millions of dollars. As pointed out in Part I, these industries are second only to agriculture in the value of their production; and they contribute to an enormous extent to domestic and export trade. Fundamental to their continuance is the maintenance of a permanent supply of the raw materials upon which they can alone thrive. Continuous supplies of wood can only be provided if the forests are retained in productive condition. In every part of Canada except the province of British Columbia, the timber supplies have been subjected to very severe depletion, and everywhere the methods of exploitation have been both wasteful and destructive, with little care or thought for the very necessary future supplies.

The very fact that, in every case, the initial development in disposal of timber resources has been carried out under the aegis of land departments, and that it is in considerable measure due to the methods pursued that the forest resource has deteriorated to its present condition, surely points to the fact that vigorous action is necessary for the constitution of proper forest authorities where they do not now exist. Even in this country, it has already been thoroughly demonstrated that it is only upon development of properly constituted services, and the inclusion in them of trained personnel, that the broader conceptions of forest management have been introduced. It is quite true that from time to time, even under the ordinary land administrative machinery, reforms have been introduced, but in nearly every instance such reforms have been the result of pressure from exterior sources, or by the assimilation of the results of experience in districts or countries where forest regulation was on a more stable and more satisfactory basis and controlled by technical services. So far as forestry is concerned, the mere introduction of some new idea or method in the routine disposing of timber does not constitute reform in treatment of the forest crop; more frequently, it savours of the expedient to meet merely the public convenience, rather than the application of some radical and effective measure which will serve the ideals of proper forest management.

After all, however, it was perhaps only natural,—certainly, it was very human,—that government administration, finding in the forest a source of revenue, should centre in its land organization the responsibility of extracting from the forest the greatest possible amount of revenue. In this one direction, some of the organizations so entrusted were eminently successful in their efforts; but in most instances the effort ceased just there, and but little heed was given to the condition of the forest after exploitation, or to the possibility of its repeating those revenues at a later time. Notwithstanding the success which such methods of securing revenue may have met with, it is significant that, one by one, as various governments have divorced control of forest

activities from their land-administrative machinery, and placed responsibility therefor in a special service, the revenues derived from the forests have been markedly increased. In the light of this fact, the argument that the older method is more productive in a monetary sense fails entirely of conviction.

If it be the case—and, everywhere in the world, experience points in this direction—that the mere function of forest protection requires the establishment of special services, how much more so is it a fact that the treatment of a productive organism, such as the forest, must be placed in control of a service especially qualified therefor. Although it undoubtedly embraces many aspects of practical business, forestry is nevertheless a science that has only attained its higher results, and can only approach the ideals, in those countries where the influence of the trained officers has been brought to bear. Too frequently, in this country, the term 'forestry' is construed to mean fire protection. As previously pointed out, fire protection is not forestry; it is, rather, a means by which the practice of forestry may be made susceptible of practical application. The two, although they are distinct phases of forest management, are inextricably related; without fire protection, the benefits of rational forest practice are lost to the country; conversely, without the application of at least some of the rudimentary principles of forestry, fire protection is difficult of attainment, and cannot of itself solve the problems of continued and profitable forest production.

From the foregoing remarks, it is manifest that the importance of the forest resource in the economic development of the state fully justifies, and indeed demands, the institution of a thoroughly modern, well-trained, properly manned and adequately paid forest service; and that it should be made the exclusive function of such a service to give effect to the forest policy which is laid down in the act creating it. The entire administration of forest lands must be exclusively vested in such a service, and no exterior organization should be permitted to hamper its work, so long as the forest service confines its attention to activities which are strictly its own business.

Aside from the futile argument previously referred to that small areas of agricultural lands justify the withholding from its proper function of large tracts of true forest land, the general argument brought to bear, for retention of timber administration in a position entirely subservient to land-administration, is that land and timber are so bound up together that one cannot be treated without dealing with the other. Obviously, timber and land are rather intimately related, but the application made of this relation, in the general argument is, to say the least, puerile. If a land-owner leases to another individual an area upon which the latter is to engage in the production of an agricultural crop, he must convey the right to clear and unhampered use of the land for the purpose proposed, and he cannot by any logical method of reasoning establish a right to alter the condition or status of the land in such a manner that the lessee is restricted or prevented from carrying out his intentions; true, upon termination of the lease the lessee is required to return the land to its lawful owner, but during the term for which the lessee may have legal control, it is entirely beyond the right of the owner to dictate the methods under which the crop shall be raised or disposed of. After all, public lands are vested in the Crown, in the right of the people of a political division; it therefore devolves upon a government to centre the administration of such resources as may be available in those services which are best qualified to protect, control, and develop them for the public good. If it is essential that governments maintain large technical staffs for the development and guidance of the agricultural industry which is distinctly a private enterprise, how much greater is the necessity that technical services be developed for treatment of the forest, which in the main is a state property, and that the function of control be vested exclusively in such services.

SESSIONAL PAPER No. 310

The service must be provided with funds necessary to the proper conduct of its operations, and it must be required to render account of expenditures incurred, and of revenues accruing from its administration. Only by such treatment, may the true position of the service in relation to the economic administration of the state be apprehended, and in this manner the service permitted to justify its existence. Whereas the old conception of timber administration consisted in the extraction of the greatest possible amount of revenue, with the minimum possible expenditure, without due regard for the retention of productive characteristics of the timber,—the modern and true conception of forest administration is: by taking advantage of all the characteristics with which the forest is by nature bestowed, by judicious use of the timber supplies which it can provide, to maintain it permanently in a productive state, so that from it there may be received the greatest possible continuous financial returns—meanwhile expending upon its upkeep such sums as are required to attain all of the objects in view.

In many parts of Canada the annual toll exacted of the forest has been out of all proportion to expenditure made in its upkeep. If we for one moment reflect on the prodigious sums which have been derived through exploitation of the forest; when we candidly consider the present dilapidated condition of the forest estate; when, by recourse to historical records, or in many cases even by the exertion of our own memories, we recall the extent and magnificence of timber wealth which this country in former years exhibited,—well may we pause to consider whether we have put, or even yet are putting, back into the forest, by way of protective effort and constructive development, the portion which is unquestionably its due. On the contrary, we have over widespread tracts bled the resource of its entire yield, we have continuously eaten into the woods' capital, we have so far failed even in adequate protection to that which now remains. It seems to have been characteristic of our race that, while we have assuredly been adepts in utilization, we have been remiss in the application of principles of conservation. As one authority has so aptly expressed it: "almost every devilish contraption for the utilization and destruction of timber owes its existence to the ingenuity of the Anglo-Saxon mind;" but we have been far less inventive in the conceiving of means and processes for the protection and proper use of timber resources. If we are in any reasonable degree to adopt the conception that the forest is an organism capable of providing successive crops of a commodity which is a basic requirement of our civilization, what possible excuse exists in a government extracting possibly two or three million dollars from the forest, annually, and putting back into it, in protection and administrative machinery, some three or four hundred thousand dollars. Manifestly, no farmer would expect to derive annually an income from five to ten times as great as the monetary value of the labour, and of all other provisions which must be made, in the process of producing agricultural crops.

It is essential to completion of the subject presently under review, that reference should now be made to the status of the various forest services throughout the Dominion.

1. NOVA SCOTIA

In the province of Nova Scotia there exists no forest service which may appropriately be designated by that name. Such fragmentary timber business as may require transaction by the government of that province is centralized in a land administration that contains no technical forest officers, and which does not employ any field staff for the conduct of timber business or the inspection of timber operations. As a result of the prevalence of forest fires, the province has had recourse to fairly efficient fire legislation, and has set up

for enforcement of the latter, a somewhat loosely jointed organization operating under direction of a Commissioner of Forests and Game. Although undoubtedly the latter officer has, since the inception of his office, acquired some considerable knowledge of forest protection problems, the government employs no technical officers who have had any intensive training in forest protection work, or who have an adequate conception as to the various other phases of forest activities that are so intimately related to the work of forest protection.

Undoubtedly, the apathy on the part of the government and of the people of this province is due to the fact that such a large proportion of the forest estate is now under private control. It need only be pointed out, however, that the importance of the forest industry in the industrial life of this province is so pronounced, that it is incumbent upon the government to exhibit a very much more vital interest in forest activities than it now displays. The serious condition to which the forest resources of Nova Scotia have already come, clearly indicates that forest management is not a function which can be left exclusively to the initiative of private enterprise; in this regard, the attitude of *laissez-faire* which has been in evidence has been productive of such inferior results, that a thorough renovation in conceptions of forest policy is imperative.

Taking into consideration the total expenditure incurred by the government in all its activities associated with forest protection work, not more than \$8,000 or \$10,000 per annum is so used. It must not be inferred that this figure represents the total amount expended in fire protection in the province; it does, however, include all expenditures made by the government. In a province where private ownership of forests has for so long continued rampant, it is obviously out of the question for the government to now adopt methods of extreme paternalism, in order to resuscitate the forest resource; nevertheless, there is an underlying obligation upon the government to exert a much more active interest in forest policy and in the activities of forest industry, to the end that the conditions of both may be greatly improved.

While it is an unfortunate circumstance that so much of the forest has been alienated, it has previously been pointed out that there still remain the nuclei of areas which may well be dedicated to permanent forest production, and excellent opportunity exists for the re-acquirement, at exceedingly moderate rates, of depleted timber lands which are still quite capable of being developed to a state of productivity. In addition to having obligations in the direction of actual forest production, the government bears the moral responsibility of in some manner guiding the efforts at forest management upon the part of private owners. Moreover, the farm woodlot in Nova Scotia, playing as it does such an important part in rural development, and in the activities of the rural populace, is a subject which well merits, if it does not actually demand, the guidance of a well organized forest service, brought into being under government auspices.

The plausible answer which may be anticipated to such suggestions obviously is that, receiving practically nothing in direct revenue from the disposal of timber, the government can ill afford to commit itself to expenditures which a forceful policy will of necessity require. Although difficulties in providing funds undoubtedly exist, such an answer to a question of such great economic importance would absolutely lack candour. While it is quite true that assessments upon timber land, made under the auspices of municipal organizations, are returned to the forest in the form of fire protection, and that added to this is the mere pittance of \$8,000 or \$10,000 directly contributed by the government in the form of staff, publicity materials, and expenses of administration, it is only necessary to point to the large amount of money that finds its way to the public coffers which is derived from direct taxation of timber properties and forest industries. Such revenue, exacted absolutely from the woods'

SESSIONAL PAPER No. 310

capital of the province, upon being absorbed into the consolidated revenue of the province, loses its identity, and is utilized to finance the government in its obligations in other directions, none of it being returned to the forest,—the latter, meanwhile, continuing its process of deterioration.

Beyond all doubt, the government of the province of Nova Scotia will be sadly derelict in its duty if it indulges in further procrastination upon a great public economic question that bespeaks the most painstaking consideration, and begs the most vigorous action for conservation and development of the forest resource, through the building up of an organization to serve that purpose.

2. NEW BRUNSWICK

In this province, governmental interest in forest questions is very much more pronounced. As previously intimated, an excellent forest act exists, and under it there is appropriate provision for a constituted authority. Perhaps more in this province than in any other, has the fact been exemplified, that the creation of an active forest service, to replace the time-worn system of timber administration through a routine land-office organization, results not only in the better conduct of timber operations, but also in increased revenue. From the time of its inception seven years ago, the Service, so far as the limitations in the numbers of its personnel have permitted, has exerted great influence upon forest activities in the province, and it has become a very agile wheel in the machinery of government. Even with the limited efforts it has been able to put forth, the service has fully justified itself with the industries, with the people, and with the administration. That it has not handled more expeditiously all of the problems that properly come within its purview, may almost entirely be attributed to the fact that it has not been provided with the funds essential to development of a technical and administrative staff of sufficient proportions, nor with adequate appropriations for the carrying out of investigations and studies which are fundamental to the improvement of the methods of forest regulation and utilization.

For several years prior to the establishment of the Forest Service, the initial steps for which were taken in 1917, the annual forest income in New Brunswick was in the neighbourhood of \$550,000. The first year through which the Service acted as a constituted authority, 1918, the revenue was over \$750,000, and since that time it has on no occasion fallen below \$810,000; indeed it has twice exceeded the million mark, once reaching over 1½ million dollars. It must be frankly conceded that these increases are in considerable measure due to increases in timber dues and fluctuations in the annual cut, but the fact remains that the Service itself has been highly instrumental in development of forest revenue. Looking at the other side of the picture, however, we find that except for extraordinary expenditure in actual fire-fighting during seasons of great emergency, the province has not materially increased the amount put back into the forest,—a mere quarter or a fifth of the revenue received; indeed the tendency has been to restrict legitimate expenditure of the forest service upon work of extreme importance. Truly, this is false economy; it would almost appear that, having become thoroughly accustomed to the nice increase which more efficient forest organization has made possible, the government now shows a tendency to parsimony in the financial support given to its forest service.

Owing perhaps to the exigencies of the financial situation, the government of New Brunswick, also, has succumbed to that very alluring temptation—the too liberal use of woods' capital to furnish current revenue. A review of Chapter III, Part I, of this report, will surely serve to convince even the most skeptical mind that the governmental authorities may with great public benefit give heed to the warnings of its forest service. It was, after all, the apprehension

with which the government of some years ago became obsessed—the fear of vanishing timber supplies—that gave rise to the forest act, as well as to the forest service. The mere existence of these two important factors in the application of forest policy cannot of itself bring about the salvation of the timber industry in New Brunswick. If it was necessary to supply the tools with which a certain piece of reformatory work was to be done, it is even more necessary to permit the unhampered operation of those implements, in order that they may accomplish the object for which they were provided.

In the provisions already made by the province, a most excellent start was made toward forest conservation. It will well stand repetition in another way, however, that if stagnation is to be forestalled, and subversion of the true principles of the Act avoided, the Government of New Brunswick must provide the wherewithal through which the Service can properly function; the Government must give heed to the advice which it is within the power and propriety of the Service to place at its disposal, and must translate into actual remedial measures the basic requirements of which it may through its forestry advisers be apprised.

3. QUEBEC

It is about twenty years since the government of the province of Quebec, recognizing the necessity of building up a forest service, realizing that technically trained men were essential thereto, and in the absence of such educational facilities in Canada, sent two promising students to a foreign university to secure special training in the theory and methods of conservation and proper forest practice. Upon completion of their training, these men returned to the province, and since that time have been continuously engaged in forest administration, and in the development of a provincial forest school from which has been recruited the technical personnel of a growing forest service.

Although it may by no means be stated that the policy effected, and the administration developed in the province of Quebec, has been all that could be desired; although it is undoubtedly true that the government of that province has extorted from the forest resource a very large revenue, which has in great degree been applied to current expenditure in other directions, it is nevertheless the case, that there has been a certain amount of stability and consistency in the movement of the Service toward more reformed methods, that has perhaps in some other provinces been rather seriously lacking. Although there have undoubtedly been weaknesses in forest administration it must in fairness be conceded that the government has shown a tendency to give greater heed to the suggestions made by its forestry advisers, and has in some directions effected legislative reforms looking to better administration and to the provision of more adequate facilities to serve the functions of forestry education and research, than has been the case elsewhere in Canada.

Although much greater interest is now being exhibited in these directions, two outstanding weaknesses in the administration of the Quebec Forest Authorities have been in lack of permanently dedicating forest lands, and in failing to adequately develop machinery for a stock-taking of forest resources within the province. As explained elsewhere, these two activities are fundamental requisites to progress in forest management. Latterly the service has imposed strenuous survey requirements upon the lessees of timber lands; let the government not adopt in too great degree the practice of 'letting the other fellow do it', and thereby lose sight of the fact that the Service itself has a very vital and far-reaching obligation to consistently engage in this process of forest inventory.

SESSIONAL PAPER No. 310

Forest industries are very strongly entrenched in the economic life of the province, and particularly in the pulp industry greater development has taken place than in any other part of Canada. If it be within the bounds of propriety to definitely point to any weaknesses which may exist, it might be stated that, although the reforms brought about by the government of Quebec in its plans for forest administration contain many excellent provisions, there has perhaps been a tendency to overlook in some measure the vital necessity of taking the industries fully into confidence, in order that the reformative measures to be imposed might be practical, and that they might be thoroughly understood by those who are to be most affected by them. It is considered entirely feasible that the authorities of this province would have made the advances which they have made, and at the same time might have enjoyed in fuller degree the confidence of the industry, had there been a greater tendency to allow them access to, and encourage their participation in, forest counsels.

Perhaps to this lack of free interchange of opinion, and the dearth of unselfish co-operation which otherwise would arise therefrom, may be attributed the action recently taken to more or less isolate from the timber administration the function of fire protection. It is understood that it is in certain measure due to pressure of the industry, which has not been satisfied with the fire protective efforts displayed by the forest service, that a special organization has been created for that purpose. It may forcibly be stated that the necessity for such action should not have been permitted to develop; and it would not have arisen, had there been greater co-operation and more intimate relation between the forest service and the forest industries. This unfortunate condition is by no means a recent development; rather, it is the accumulation of sentiment over some years. It is over ten years since timber-holders in the province of Quebec, being dissatisfied with the methods of protection then in vogue, insisted upon the privilege of themselves carrying on the function of fire protection. The situation was quite analogous to a case in a large city where, for instance, one large part of the community—the wholesale section, for example—being dissatisfied with the fire protection afforded by the municipality, might demand that they be absolved from their contributions to the municipal fire fund, through taxation, and be permitted to install their own fire protective personnel and equipment.

Just as might be expected, if the demand in the hypothetical case above suggested were acceded to, in the fire protection situation in Quebec things developed to the stage where neither party considered that the efforts being put forward by the other were sufficiently comprehensive or successful. In the progress of fire control works, by reason of the existence of two organizations, and in some cases due to an overlapping in functions a certain amount of jealousy arose which made it necessary for the government of that province to take some action for the improvement of conditions generally. It is most unfortunate that one feature of this action consists in the segregation of the functions of timber administration and protection into two distinct branches; but it may at least be hoped that permitting the forest protection work to develop to that extent which the fire situation demands, will bring about very much improved conditions in that regard; and that, later on, when conditions are propitious for reuniting the two services, the opportunity for such action will immediately be seized and put to advantageous use.

Forest protection and timber utilization problems have attained such paramount importance in the economic development of the province of Quebec, that no longer will conditions permit of half-hearted effort in their solution, or of petty disputes and jealousies as between various organizations having interest in and responsibilities therefor.

For many years, the province of Quebec has enjoyed an enviable reputation for careful administration of public finance. Some other provinces have, through heavy expenditure in public works, and through over-optimistic development, been reduced to a state approaching financial embarrassment. Quebec, however, is more frequently alluded to as an outstanding example of what can be accomplished when a tight rein is held upon the public purse. To a material extent, however, its position in this respect has been built up upon the practice of withdrawing capital from the 'forest bank' and placing it in the public purse for general current expenditures, effecting in this manner a serious reduction in the capital growing stock of the forest. Nothing is more reasonable, more economically sound, or more adequately serves the true principles of conservation than that mature timber should be harvested and put to proper use. If in so doing, however, an unreasonable amount of the revenue so derived is diverted to other phases of public administration, without putting back into the forest the proportion which is essential to its successful permanent maintenance, it may truly be said that a province is merely manipulating its financial position at the expense of its natural resources.

4. ONTARIO

For a great many years the province of Ontario simply drifted along without any clear conceptions of forest policy, and with a very loosely jointed method of administering the forest resource. The development of a technical forest service had its origin in connection with tree planting work, rather than as a result of appreciation that management of timber lands required the services of technical men. For many years after the nucleus of a forest service was installed, the organization itself made no effort to expand and absorb those functions of public administration which absolutely came within its proper scope.

In the meantime, as previously implied, a very loose and cumbersome organization was developed under the control of land-office routine for the administration and protection of the timber resources. About ten years ago, however, the province became aware of at least some of the deficiencies, and steps were taken to place fire protection in charge of the Provincial Forester who had previously confined himself to tree-planting and educational work. It has always been a condition which begged explanation that, while the government very evidently appreciated the necessity for specially trained men—in that, some sixteen or seventeen years ago, it established at its university a curriculum in forestry—several years passed before the slightest advantage was taken of the men so trained, notwithstanding the fact that the cost of educating them was in a large measure being defrayed by the province. Even after concentration of tree-planting and forest protection functions in the one service, several years expired before more than a sprinkling of technical men was employed, notwithstanding the fact that in other provinces it had been clearly demonstrated that technically trained men were, if not absolutely essential to the conduct of proper fire protection, at least a very advantageous acquisition thereto. However, after several years of watching these men go into other fields, the province eventually did comprehend that considerable advantage was to be served in building up an organization of men trained under the auspices of its own university.

Some three or four years ago further steps for consolidation of forestry functions were taken, and the forest service at last came into control of the timber administrative machinery of the government. If it be claimed that the latter phase of the work has not exhibited signs of great improvement, it may without question be attributed to the fact that, in endeavouring to cope with very complex problems in organization for fire protection, the service has

SESSIONAL PAPER No. 310

perhaps given less heed to the demands of timber administration than the conditions of the latter would justify. After all, a government is indeed absorbed by multifarious problems requiring solution; if, therefore, a good forest act be provided; if provision for constitution of a proper service be made; and if funds for proper conduct of the work be made available,—it must surely remain for the service itself to develop the fine points in its policy, and to justify its existence by taking a firm grasp upon the problems which confront it. In other words, having through the good graces of the government been created as an entity, it devolves entirely upon the service itself to exert with the utmost possible force the functions which are upon it bestowed,—to the end that it may become a forceful factor in economic administration of those resources of the province which are placed under its responsibility.

When the extent of the resources to be administered and protected are reflected upon, and the funds which have for several years been made available to this end are considered, it is quite apparent that the forest service of Ontario has been treated quite as liberally, if not actually more so, than have other provinces in the Dominion. This fact notwithstanding, there is ample evidence that the government of Ontario also has followed the practice of extracting too great a toll from its forest resource, without returning thereto, by way of protection and competent administration, the amount which proper conduct of the forest business would demand.

As is the case in Quebec, so in Ontario, the forest industry is of extreme importance in the economic development of the province. As pointed out in Chapter V, Part I, a situation has developed in the balance as between timber production and wood consumption which can only be rectified by the application of vigorous measures. If remedial measures in this direction are to be expected, on the one hand the government must give its forest service a freer hand in the formulation and pursuance of policies which will permit of improvement; on the other hand, the service must arouse itself to obtain these readily justified concessions from the government, and upon receipt of them to exert a forceful attitude in the performance of its various functions.

5. BRITISH COLUMBIA

In that part of the report which deals with the forest resources and forest industries of the province of British Columbia, a clear conception has been given as to the extreme importance of both in the development of the Coast province. Gorging in a wealth of timber far surpassing anything else in the Dominion, it was some considerable time before the necessity of proper administration was borne in upon the government. Twelve years ago an excellent forest act was put into force, by it was brought into being a forest service which has been very active in administration of the forest resource. As so frequently happens, when a business of this character has been allowed to slide along in somewhat haphazard fashion for a period of years, particularly in a province which has had so rapidly to surmount the obstacles of pioneering, when action was taken, it was of most comprehensive character. Truly, the British Columbia Forest Act portrays all the features of western optimism, and the desire to do things on a comprehensive scale.

It is, however, also characteristic of legislative reforms that are brought about so rapidly, that although they serve to better conditions to a very great extent, they are not always acted upon in their entirety. Not long after the British Columbia Forest Service got under way the war broke out, and there was consequently a serious depletion in staff. For a considerable period of years, therefore, some of the more fundamental phases of the policy laid down in the Act received scant attention. For the greater period of time for which it has

been in force, by far the larger portion of time and effort on the part of the service has been expended in forest protection and in the administrative routine of handling a gigantic timber-sale business. To some of the more refined aspects of forest management, the Forest Service, with its limited personnel, simply did not have the time which their relative importance would warrant.

Possibly somewhat obscured by the fact that nature has in large measure herself classified the forest lands of British Columbia, there has not, for instance, been sufficient attention given to the process of permanently dedicating true forest lands. At the time the service was inaugurated, the government of the day, and the forest service itself, dilated somewhat extensively upon the intentions of the administration in the permanent assignment of forest lands to timber production. It was not, however, until within the past two or three years, and even then only by reason of the necessity for providing watershed protection in the dry-belt, that concrete action for the creation of forest reserves was taken. Although these reserves were not created with the primary object of timber production directly in view, the very act of creating them has, perforce, brought to the attention of the service the existing necessity for the redemption of its pledges to the broader principles of forest conservation. It may, therefore, reasonably be anticipated that the dedication process will from now on receive much greater attention.

So much for the temporary weaknesses in the Forest Service itself; it may also be pointed out that, in this province also, the governments have exemplified a most active interest in the production of revenue from timber resources, at the same time neglecting to face the urgent necessity of spending more money upon the protection and administration of a forest resource which is of the greatest possible import to the province itself, and which must also play a large part in the provision of wood supplies for the internal consumption and external trade of the entire Dominion.

It has previously been pointed out that it is the very existence of the huge stands of high grade timber in British Columbia, and the prevalence of tree species and climatic conditions which induce the rapid regeneration and growth of timber, that furnish the leverage by which that province has so successfully overcome the handicaps of distance from extensive markets. Continued prosperity of the timber industry, which is by a wide margin the most important in the province, is absolutely contingent upon the maintenance of those advantages which, as explained above, the province now enjoys.

The timber resource furnishes in great measure the revenue upon which the province depends. During the financial stringency of more recent years, there has been a tendency upon the part of the government to require some reduction in expenditures of the Forest Service. It may emphatically be stated that, if under such circumstances a government feels that there is necessity for speeding up the efficiency of a forest service which may already be in existence, it is most assuredly quite appropriate to take action toward that end. The crippling of an organization which is just getting nicely established, however, by in measure withdrawing financial support essential to its full continuance, is not only extremely discouraging to the service itself, but can in no manner be justified in sound economics. The effort should be to secure greater value for every dollar spent in forestry activities, rather than to cheapen or stifle the organization, and in this manner jeopardize the safety of a source of revenue which is basic to financial soundness of the province.

In no other part of Canada is there a more thorough appreciation of the fact that in the forested districts all efforts at settlement must be made to conform to the requirements of forest policy. It might naturally be expected that, in a province where the amount of agricultural land is relatively so limited and the amount of timber so great, there would perhaps be a tendency to sub-

SESSIONAL PAPER No. 310

merge timber problems to the requirements of settlement. The policy of the government of British Columbia, however, has been soundly expressed in the Forest Act, and, from the standpoint of forest conservation, it may be stated that the administrations which have from time to time operated under the Act, have thoroughly recognized that the timber of British Columbia is the primary natural resource; and that, except in restricted areas of purely agricultural lands, all arrangements for settlement are made to subserve continuance of the forest.

It is also worthy of mention that in British Columbia there is evidence of much more intimate, and more co-operative relation, between the forest administration and the industries. The views of the industry are given the most serious and sympathetic consideration in the counsels of the government upon forest questions, and generally, in this regard there are signs of a most healthy condition which, if permitted to continue, must unquestionably result in the attainment of the ends which are of paramount concern to both—forest conservation.

6. THE DOMINION

It would manifestly be unfair, after such frank, even if somewhat general treatment, of some of the deficiencies of provincial forest authorities, if the Commission were to refrain from equal candour in dealing with the same question for the Dominion. It was forcibly brought to our attention at public hearings, by persons in no way connected with the government services, that there exist in the Dominion organization some conditions which make impossible the attainment of the degree of efficiency which the forestry situation demands. Into this situation the Commission has taken occasion to enquire. Referring first, however, to the general attitude of the Dominion toward forest conservation, it may at the outset be stated, that, although the federal government is by no means making the financial provisions which the work merits, if it be proper to use as a gauge the ratio between revenue and expenditure, they have, relatively speaking, gone a very great deal further in the provision of financial means than have any of the provinces. It is not argued that the federal government has gone farther than might naturally be expected; rather, the situation is that commendation is due for accepting in large measure an obligation, which, in view of revenues derived from timber resources at its disposal, might under less statesmanlike or more selfish administration have been shirked.

The federal appropriation for the various activities carried on by its forest service is upwards of a million dollars per year. This is expended in tree-planting work on the prairies; forest protection on all timberlands in the prairie provinces, the Railway Belt of British Columbia, and the Peace River Block in the same province; timber administration and development on forest reserves throughout the same regions; silvicultural research work in nearly all provinces of Canada, the furnishing of silvicultural advice to private timber owners; co-operative work toward conduct of forest inventory in various provinces; the operation of the Forest Products Laboratories at Montreal and Vancouver—where research in all phases of forest products, and technical service for the industries, are provided; in the conduct of forestry publicity throughout the country; and miscellaneous other work relating to the foregoing.

It will therefore be perceived that the work divides itself into six main classes (1) administration, protection and development of timber lands; (2) prairie tree planting; (3) silvicultural work in eastern Canada; (4) forest inventories; (5) forest products research; and (6) publicity. With all but the first of these, there is little to be offered by way of criticism, except that the limitations of funds and staff do not permit of the operations being carried on with sufficient intensity and over sufficiently widespread areas. It is in connection with the

first of these,—treatment of timber lands—that the Commission senses a necessity for some detailed consideration.

In the preceding chapter, and elsewhere, at least some idea has been conveyed of the overlapping which exists in the federal forest authorities. A brief summary of development of the organization will give a clearer conception of present conditions and the underlying reasons therefor. As was the case in all provinces, administration of timber resources was first developed in the land-forestry organization. About twenty-five years ago, the first Superintendent of Forestry was appointed. He was not a technical forester, as in earlier years there were no men of this calling in Canada. He had, however, become imbued with some of the principles of forest conservation, and entertained ambitions of greatly improving forest administration in this country. In short order, he secured the services of two or three technical men. In one direction, he started the prairie tree-planting work; in another, he laid the foundations of forest reserves policy; in still another, he inaugurated the forest protection service; continuing meanwhile to act in an advisory capacity to the Department in connection with its timber problems. Although his status may have been somewhat loosely defined, his relation to the timber administrative problems, and to the development of policy in connection therewith, increased in importance. By the year 1910, the soundness of the tree-planting policy had been thoroughly proven, the forest reserves had been increased in area, the fire protection service had been developed to larger proportions, and the Superintendent of Forestry—by this time, another individual—exercised the direction of policy in timber administration.

The year 1911 witnessed, on the one hand, the passage of a much broader act for control of forest reserves—a distinct advance in forest policy—but shortly thereafter a most unfortunate change was made, in that the function of control in timber policy outside of forest reserves was withdrawn from the head of the forest service, and vested exclusively in Timber and Grazing Branch.

This retrograde action at one fell stroke entirely divested the timber-administrative organization of the services of the technical staff which had meanwhile been developed to considerable proportions in the forestry service. This unfortunate condition has continued for upwards of twelve years, during that period there has not been on the staff of the Timber Branch a single forester, and until very recently the policy has developed entirely without any technical guidance whatsoever. The bald situation is that, whereas on the one hand the government has built up in the Forestry Branch a strong organization for forest protection generally, and for timber administration on some 22 million acres of forest reserves—a service which is thoroughly characterized by a technical administration—it has, on the other hand, left to the control of the Timber Branch—a thoroughly routine administrative organization, albeit manned with thoroughly conscientious officials—the handling of the greater part of the merchantable timber on Dominion Lands in western Canada. Notwithstanding the fact that aside from affording protection, the time when technical help is most urgently required,—when the timber crop is being, or is about to be removed—for twelve years, the timber berths in Manitoba, Saskatchewan, Alberta, and in the British Columbia Railway Belt, have been exploited without the slightest attention to the truly forestry aspects of utilization.

But the situation is perhaps even more serious; even on licensed timber berths created prior to, but situated within, the forest reserves—on which areas the government is obviously committed to a policy of consistent forest regulation—the control of timber operations lies exclusively in the non-technical organization; consequently, notwithstanding an active policy for proper

SESSIONAL PAPER No. 310

treatment of forest reserve lands, the forestry service has had absolutely no voice in the determination of timber policy on timber berths, and the latter have been operated without any regard for the requirements as to silviculture or fire protection. Time and again this lack of control has frustrated the efforts at proper management on adjacent lands within the forest reserves, in a measure nullifying the attainment of purposes for which the reserves were created, and incidentally retarding the success of the technical organization.

It has previously been explained that there is an intimate relation between forest protection and timber utilization; without adequate fire protection forest production must fail, and utilization becomes impossible; conversely, if fire protection is to be effected there must be some control over timber operations. In these circumstances, the anomaly which exists within the forest reserves is at once apparent; when it is observed, however, that precisely the same condition obtains in all other timber lands under control of the federal government in the West, it is manifest that this extreme inconsistency permeates pretty thoroughly the entire organization.

Fundamental to any successful plan of fire protection is the employment of a permanent skeleton staff throughout the year. Just as the volunteer fire brigade must, on account of its inefficiency, give way to a permanent brigade when an urban community passes the stage of infancy, so must a forest protection staff, if it is to be efficient, carry at least a skeleton organization throughout the year. While a private concern may perhaps afford to carry valuable employees over a period through which their services may not actually be required, no government service could withstand the criticism of so doing; consequently, if the skeleton staff essential to adequate fire protection is to be provided, it can only be on the assumption that work may be supplied throughout the year. This is a perfectly simple thing to do on a forest reserve, and in that behalf furnishes one of the strongest organization reasons for establishing permanent forests. However, on timber lands not so reserved, there is under the present state of affairs, no work in which the skeleton staff may be really profitably employed. It is true that some trivial employment might be devised—a mere pretence at continuity in service—but this would of itself be subversive of the object in view, in that it would entirely ruin the morals of the staff.

Looking now, at the field work of timber employees; to a greater extent their serious work is performed outside of the fire season, while during the summer they are to a greater extent employed on work of a trivial and routine nature.

It is at once apparent that solution of the difficulty lies in combining the work of the two classes. The inter-relation of the two phases of forest activity of itself clearly justifies such a deduction; but, when it is observed that it would also usefully serve to overcome the present impossibility of carrying a permanent skeleton of fire protective staff on Dominion lands, the logic of such a solution is demonstrated beyond all question. Frequently it has been argued that, even with present dual control in forest activities, consolidation of duties could be effected for these two classes of employees. Without question the physical act of so doing could be effected, but it would not accomplish the objects in view. Such a proposal entirely fails to take cognizance of the frailties of human nature; it ignores the axiom that the average man cannot properly serve two employers. In the odd case, it may under emergency be successfully done for a limited period of time, but as a general proposition it is economically unsound, it is not susceptible of practical application, and it is perverse of discipline so essential to successful operation of a fire-protective organization. It is one thing to assign to dual duties an employee whose intrinsic value to an employer lies only in the actual labour he is capable of performing; it is quite another thing, however, to place an employee, upon whose efforts timber values of

14-15 GEORGE V, A. 1924

great consequence are at stake, under responsibility or obligation to perform work for any other organization. Again, while it is quite a feasible thing to provide that two field men, performing different lines of work, should be supervised by one head office, it is almost assuredly not possible to secure efficiency under a system of organization which provides that the one field man should work under the direction of two distinct supervising offices.

Before voicing the obvious conclusion which arises from the foregoing discussion, one or two other points which have a very decided bearing upon the general problem must receive attention. The importance of an intimate and thoroughly co-operative relation between the forest services and the forest industries has already been discussed. In many instances, forest services have, in their initial stages, had to contend with an inherent prejudice, if not an active opposition, upon the part of timber operators. This condition arises entirely through a difference in viewpoint. Although at times a forest service must—if it is to work toward the objects for which it exists—impose measures which may conflict with the views of the operator, if that service is to attain permanent success in public administration, it must gradually win the confidence of the industry. In earlier stages, this confidence may only take the form of a beneficent tolerance, but ultimately the service must create general confidence in its own work and in the objects thereof. The trait of unreasonableness is no more characteristic of the timber operator, than it is of any other class of hard-working human beings; and even if a forest service must start out with a viewpoint diametrically opposed to that of timber operators, there is at least this to be said: that, whereas the forest service exists for the express purpose of perpetuating the timber supplies, the forest industry depends for continued existence upon that very condition which the forest service has as its objective. Here indeed, is common ground; in the appreciation, on both sides, of that common interest, lies the means whereby the prejudices or animosities may be removed.

In view of the fact that the forest organization is the public servant, to it, falls the primary responsibility of justifying its position, and of popularizing itself by efficient and practical administration. The Commission strongly believes that in the anomalies of departmental organization previously described, lies the fundamental reason for which the industries, the public, and even other departments of the government administration, have perhaps failed in understanding, or in appreciation of, the efforts put forward by the federal forestry service. On the one hand, it is burdened with the difficult and thankless task of fire protection—in its successes, hardly noticed; in its failures, strongly condemned; on the other hand, by the retention of timber administrative functions in another organization, the very means by which the forest service must be brought into that intimate relation with the forest industry, is denied. Meanwhile, under this faulty organization, the greater part of forest utilization on Dominion lands continues without technical guidance, by which means alone better conditions for protection and for regeneration of a new stand may be brought about.

The question may well be asked whether, in the sufferance of such pronounced anomalies, the relation which should exist between head offices and field staffs is in any way comprehended? A manufactory in the East may, through the enlargement of its business, find necessity for the establishment of branch houses in western Canada; in these circumstances the field offices obviously exist for the convenience of, and transaction of business for, the headquarters in the East. In treatment of timber resources under control of the federal government, however, it must be kept clearly in mind that those resources lie in the West; therefore, rather than conceiving that the field staff

SESSIONAL PAPER No. 310

exists merely for the convenience of a Head Office, the true conception is that the latter should be so construed and administered as to meet the requirements of the forests of western Canada. A realization of the fact that the forest is something more than a mine, from which so many thousand dollars must be extracted for revenue purposes, will assist greatly in an appreciation that, if the forest resource is to be properly managed, a service properly organized is the one and only means to that end.

The degree to which an exaggerated viewpoint as to the importance of 'current revenue' may entirely oppose the operation of fundamental economic factors is exemplified in the present methods of timber berth administration. Largely because the payment of ground rentals, and charges of such character, provides in the aggregate a considerable revenue, there are instances where timber berths which consist essentially of agricultural land are permitted to be continued from year to year, notwithstanding the fact that there are contained in the licenses requirements as to progress in utilization, and provision for withdrawal of agricultural lands upon removal of the timber. Such treatment of forested agricultural lands is not only inherently unsound, but has an effect entirely destructive to the successful application of forest policy, in that it obscures from the public view the aims of forestry; in many instances, the forest service which has no responsibility for the existing fault, and with whose policy the practice is entirely in conflict, suffers the weight of unwarranted public opprobrium.

What other conclusion is there to be reached, or what other suggestion to be made, than that the federal government should without further delay vest in its forest service those functions of the administration which have to do with the production, protection, and utilization of federal timber resources.

While it is manifestly foreign to the right or duty of the federal government to interfere in the details of forest administrative matters of the provinces which control their resources, it is strongly the view of the Commission that the federal government through its forest service should take a keen interest in all those phases of forestry work in the Dominion which assume the aspect of national consequence. As a basis for this broader field of activities it is essential that thorough consolidation of forestry functions within the forest service should be effected. In such consolidation the Commission sees an opportunity, not only for the better conduct of those matters which are the exclusive function of the federal government, but for a much broader forest policy, which involves close co-operation with all forest authorities in the country, in solution of forestry problems throughout the Dominion. The Commission has had brought to its attention that, even now, some excellent co-operative work is being carried on between the federal and provincial services, but progress in this direction is seriously hampered by anomalies consequent upon the overlapping in functions within the federal organization.

The claim is not made that by such consolidation there will be any great saving in expenditure; rather, the gain will be in greatly increased efficiency of administration. When it is considered that in Canada, under existing conditions of political division, there must be at least six forest authorities (the federal and five provincial) the necessity and opportunity which exist for standardization in legislation and administrative methods is at once obvious. In this latter direction, as in many others, the federal service can be of inestimable service to Canada and to each individual province thereof. After all, is this not the higher conception of the principles underlying Confederation?

CHAPTER VII—FOREST SURVEYS

Forest surveys of one class or another are a basic requirement of almost every phase of forestry. They are in evidence during the process of land-classification; they again appear in the demarcation of areas dedicated to forestry; they are required in the administration and protection of timber areas; they are essential to the effective application of any management plan to specific areas. There is indeed practically no forest activity in which the survey does not furnish the basis of the plans. Inasmuch as the main subjects to which surveys of the several foregoing types relate, have already been, or in ensuing chapters will be considered, it is not essential to the present discussion that they should here receive detailed treatment.

Of far greater importance, in the question with which the Commission is under the necessity of dealing, are surveys made for the purpose of stock-taking; that is to say, forest inventories. While it may be possible to frame the basis of a forest policy without detailed knowledge of the amounts of timber available, it is essential to the development, and in giving effect to that policy, that reliable estimates should be secured, upon the basis of which plans of management for sustained yield may be based. Aside from the latter, however, it is of paramount importance that, for the country as a whole, and for the various provinces or regions thereof, we should have a much more intimate knowledge than we now have as to the actual timber resources.

Of two or three outstanding facts in the forestry situation which have during the course of its enquiry been firmly impressed upon the Commission, one, most assuredly is, the glaring lack of detailed knowledge regarding the extent of timber supplies. Some of the factors contributing to this inadequacy of data have been discussed in Part I, and repetition of them is unnecessary. Very necessary, however, is the reiteration, in the strongest possible terms, of the urgent necessity for further work of this character. Every forest service in Canada, provincial or federal, only too freely admits that its knowledge of the extent of timber resources is entirely inadequate. Every such service is imbued with the strongest desires to increase its knowledge by means of forest surveys, but unfortunately each one of them works under limitations as to funds and staff which simply do not permit of the necessary progress in this branch of their work.

Any business which involves the derivation of annual revenue reaching into the millions naturally justifies, and indeed demands, that concrete knowledge should be available as to the extent to which revenue may be so extracted without impairing the capital. In Canada, we have so far pathetically failed in the application of this principle, for notwithstanding the great amount of work which has been done, our knowledge of actual timber resources of the various regions is at best imperfect.

Although the data regarding pulpwood resources and timber supplies generally, presented by the Commission in Part I of the report, is based upon the most accurate information available, it is admitted without any reservation whatsoever that in many instances the statements and records from which conclusions had of necessity to be drawn were seriously lacking in accuracy. As has been explained, however, in every line of business, when the detailed knowledge necessary to the solution of some particular problem is not sufficient to permit of accurate calculations, it is necessary to canvass the situation and to resort to the use of the most reliable estimates which can be secured.

After all, there is only one means by which an inventory of reasonable accuracy can be made, and that is by the conduct of extensive reconnaissance surveys. Inventories so far undertaken have consisted partly in the results of such surveys carried out under standardized methods; partly in the results of

SESSIONAL PAPER No. 310

more intensive cruises performed on specific areas by forest services or timber owners; and, partly in the application of average figures secured by the foregoing means to more remote areas upon which there is a general knowledge of timber conditions, but in which no actual surveys, even of the reconnaissance type, have been undertaken. Indeed, it has at times been necessary to apply a general knowledge of forest conditions to considerable tracts which have not even been explored. By reason of the latter aspect in some forest inventories that have been made, people have at times been inclined to dispute the wisdom of using inventory figures which have their basis in such crude methods of determination. It may, however, be pointed out that, even without exploratory surveys, the general character of forest growth on a remote area may in general terms be determined, by reason of the fact that the extent and character of forest growth is definitely controlled by climatological factors, by elevation, by latitude and by topography. The application of these fundamental factors in forest geography, permits of reasonable determination of the conditions probably existing on remote areas.

Thoroughly conceding the inaccuracies of inventories of this character, however, it may for the reasons explained be taken that such inventories are very far superior to no inventories at all. The importance of using even imperfect information of this character has been thoroughly demonstrated in past years. Until comparatively recently the average person in Quebec, Ontario, or even some of the other provinces, has entertained the idea that the unexplored north country contained vast stretches of excellent timber, although under conditions existing it was not susceptible of commercial exploitation; many people even yet are deluded by a belief of this character. For those, however, who have taken occasion to enquire or to consult the various reports from time to time issued, such delusions have been entirely dissipated; that is to say, the placing of estimates in such form that they may be accessible to the public serves a very useful and necessary purpose in informing the people as to the status of our resources.

Although these inventories have in greater or lesser degree brought to the attention of the people the necessity for forest conservation, we must not labour under the impression that further and more intensive work of this character is not required. As previously intimated, for the entire Dominion it is of utmost importance that we should have a good general knowledge of the amount of timber we have, in order that we may apply to the business administration of that timber the principles and methods which will permit of its continuance. Moreover, it is necessary that by surveys and investigations we should have more intimate knowledge as to the losses which have been sustained through natural or accidental causes, and that we should secure much further knowledge as to the rates of growth which apply under the varying conditions in different parts of the country.

There has perhaps been the tendency, even in districts where only extensive reconnaissance has been carried out, to simply leave it at that. In the press of other work, for some years at least, there may be a disposition to forego the more intensive surveys. The Commission, however, strongly expresses the view that, for a great many years to come, it will in various parts of Canada be necessary to have carried out, on a consistent year-to-year plan, both extensive and intensive forest surveys, in order that we may obtain more accurate data as to our resources, and thus be able to make practical application of such information in timber administration.

A summary of the work which has so far been done is of interest. In Canada, the extensive examination of forest lands was first put into general effect by the federal forestry service. During the course of fifteen years, extensive tracts of timber lands in Western Canada were subjected to extensive

forest survey. In Manitoba, a very material part of the timbered area of the province has been surveyed by extensive methods, and type maps prepared. Similarly, in Saskatchewan the greater part of the accessible timber area lying to the north of the agricultural belt, and also some of the hinterland, have been examined and mapped. In Alberta, the greater part of the Rocky Mountain and Foothill areas have been examined extensively and mapped, and in more recent years, the preliminary work has been supplemented by much more intensive surveys. Similarly, the Lesser Slave, Peace River and Lac la Biche areas have been examined and mapped. Finally, in the Railway Belt of British Columbia, a great deal of extensive reconnaissance has been performed, and, on many of the forest reserves created as a result of this survey work, more intensive surveys and maps have been made.

It may here be stated, that much of the extensive reconnaissance work carried on by the federal forest service in years past served as an excellent basis in land-classification. At the time it was undertaken, no general classification work of this character was being carried on by any service, upon the basis of which the permanent assignment of forest lands could be made. It was several years later that, resulting from the activities for soldier settlement, the land-classification work, as a specialized activity, was devised and put into effect by the Topographical Surveys Branch of the federal organization.

It may with accuracy be stated, that the federal forest service has, year in and year out, given more serious attention to this very important question of surveys than has been the case elsewhere in Canada. Such surveys have not only served the purposes of classification and forest inventory; they have formed the very essential basis for the many activities consequent upon forest reserve administration.

In 1909 the Province of Nova Scotia financed a rapid forest survey conducted by technical foresters, and the results were later published by the Commission of Conservation; as so frequently happens, however, where no service which can make practical application of the results of such work exists, the report was placed upon the shelf, and since that time its dusty pages have been used only for casual reference by the government or by others, at any time some information regarding the forests of this province was required.

Over a period of several years, the Conservation Commission, in co-operation with the British Columbia Forest Branch, carried on a forest inventory in that province. The report of this survey indicates probably one of the most complete attempts at inventory yet undertaken in Canada. The work was very extensive in character, but use was made of all of the most reliable data extant. Since then a limited amount of survey work has been carried on in that province, but more generally, it has consisted in the examination of specific areas, aimed at timber sales, etc., rather than for the purpose of general stock-taking. Extreme caution is required to see that the very existence of this valuable report, extensively used as it is, by both the forest service and the industry, does not deter the authorities of that province from the pursuance of further forest survey work, especially designed and carried out for the purpose of amplifying knowledge as to the forest conditions generally, and to offer the basis for various phases of forestry work.

Before its abolition about three years ago, the Conservation Commission entered into a co-operative arrangement with the Ontario Government, with the object of conducting a forest inventory in that province. Notwithstanding the many years through which the forests of that province had been exploited, there was not available any consistent or extensive information as to the forest resources, the forest service itself rarely having undertaken survey work of this character. The work, in these circumstances begun under the auspices of the

SESSIONAL PAPER No. 310

now defunct Conservation Commission, has since been carried on by co-operation between the federal and provincial forest services. It is not yet completed, but much valuable information has been secured, and before very long it should be possible to present to the governments, to the public, and to the industries, a report on Ontario resources, corresponding favourably with that already in existence for British Columbia.

One fortunate result of the very carrying out of this kind of work has been the inauguration, by the Ontario Service, of a system of forest surveys, one district at a time, for the purpose of mapping the timber resources in the various regions. It is upon the basis of such work that the formulation of management plans may be founded; therefore, money expended in this direction, in addition to serving meanwhile the requirements of administration and protection, brings forward the date when Ontario may make application of such of the principles of forestry as economic conditions may permit.

In Quebec, and so far as unalienated forest lands are concerned, the program of forest survey work lags behind that of other provinces. It is not to be inferred that no such work has been undertaken by the forest service; but rather, that in its efforts to bring about the survey of timber lands licensed to pulp companies and to lumber companies, by the holders thereof, the forest service itself has not gone nearly so far as it might have done, in the examination of timber lands controlled by the province. Whether or not it be by co-operative work between the federal and provincial services, it is of great importance that a general survey of forest conditions in Quebec be undertaken, in order that more accurate knowledge of the timber resources may by this means be made available. Surveys carried out exclusively by the provincial forest service are also necessary to furnish the basis of more accurate and more consistent work in other forest activities.

Reference has already been made to the consistent year-to-year survey which has been undertaken by the forest service of New Brunswick. For seven years this work has steadily progressed, until now over 60 per cent of the Crown land areas has been examined and mapped. For that province, it is not so necessary to urge the necessity of survey work as to point to the desirability of putting the facts secured from such surveys to practical use in the forest policy.

Generally, for both federal and provincial governments, the Commission is impelled by the dearth of reliable data regarding forest resources to reiterate its view that, owing to the fundamental purposes which forest surveys serve, a much more consistent, a far more widespread, and very much more general plan of forest survey work should be instituted; that this may be made possible, it is essential that more adequate funds should be provided for this specific purpose.

CHAPTER VIII—FOREST PROTECTION

The work of forest protection involves the control of all factors which may operate to destroy the value of timber or of timber land. Such definition would obviously include the protection of forest areas against losses through theft and similar causes. The latter, however, are susceptible of thorough control through the operation and enforcement of timber regulations, so that it is unnecessary to treat with them further. Discussion will therefore be confined to losses through accidental or natural causes which, by their nature and extent, require for their solution the provision of special control measures.

PROTECTION FROM INSECTS AND FUNGI

In Part I of the report repeated references have been made to the losses sustained in the forest as a result of the depredations of insects. For a great many years in this country, but little attention was given to the very important

subject of forest entomology. As a matter of fact, although there have undoubtedly been insect epidemics at various periods during the entire course of historical times, these very evidently have not been of such serious or widespread consequence as to demand and secure the more careful treatment which, as a result of development of science, is now made possible.

Although undoubtedly forest insects have operated to destroy timber from earliest times, it is more recently, and it is as a result of the deteriorated conditions to which our forests have come, that insect manifestations have assumed more dangerous aspects. A few cases in point are, the attacks of the spruce budworm in Quebec, New Brunswick and Ontario; the operation of the larch sawfly, which some thirty-five years ago practically wiped out the stand of merchantable tamarac in Canada; and finally, the attacks of various dendroctonus bark beetles in the forests of British Columbia.

It is not proposed to enter into any detailed discussion of these outbreaks, for they have been the subject of careful treatment in various entomological reports which have been published. It is, however, appropriate that brief reference be made to the conditions which have given rise to one or two of these attacks. Taking, therefore, the spruce budworm as an example,—this insect during the past ten years has wrought damage to the spruce-balsam stand of eastern Canada amounting perhaps to 150 million cords. The name which has been given the insect unfortunately conveys the impression that it operates to a greater extent on spruce; this, however, is not the case, as balsam is the tree more favoured as a food by this very active agent of destruction.

For a great many years the forests of New Brunswick and Quebec have been very extensively operated for spruce. Until about ten or fifteen years ago, however, the operations were in large measure confined to the taking out of larger spruce timber. With the development of the pulp industry, however, and also the continued reduction in the size of saw-logs, an incentive toward the use of smaller timber was given, so that over a given area the tendency has undoubtedly been to utilize even a greater proportion of spruce. Balsam never has been, and probably never will be, used to any great extent for lumber, as it has certain physical defects which render it an inferior wood for this purpose. Within the past few years, however, it has been thoroughly demonstrated that, so far as fibre characteristics are concerned, balsam is quite susceptible of successful use in pulp manufacture. Indeed in the province of New Brunswick it has, during the past few years, been used for this purpose to about the same extent as spruce.

Preceding the use of balsam for pulpwood, however, there was a long period through which practically the exclusive use of spruce for pulp obtained, and, as between the use of spruce and balsam, the same thing may be said of lumbering operations. Under these circumstances the proportion of balsam in the coniferous stands of New Brunswick and Quebec rapidly increased, and in this manner conditions in the forest became propitious for the attack of an insect which preys primarily upon the balsam. Although the aggregate of the damage which occurred in the province of Quebec was very much larger than in New Brunswick, in the latter province the great bulk of the balsam was destroyed, and, owing to the severity of the attack, the insect spread to spruce. Although the epidemic has now spent itself, the damage which has been wrought is nothing short of appalling, and, in New Brunswick at least, it has been the means of bringing about a very serious situation in the timber supplies available.

Perhaps there is no better illustration than the budworm epidemic, as to what may happen when, through continued extravagant utilization of the more valuable species, and the leaving of others which apparently have no value, the natural balance of the forest conditions developed by nature is seriously

SESSIONAL PAPER No. 310

disturbed. Although forest insects may be found operating in any healthy stand of timber growing under natural conditions, it is to a great extent due to the upsetting of, or interference with, such natural conditions, that outbreaks of this character occur. In other words, the methods of utilization adopted in this country have been such as to disturb the natural balance, and thereby have rendered possible the development of various insects to abnormal proportions; our methods have predisposed the forest to the attacks of such insects.

In addition to utilization, however, there are several conditions which have given rise to increase in the severity and frequency of insect epidemics. To a greater extent forest insects first attack trees whose vitality has been weakened. There are, indeed, some insects whose operations are confined entirely to dead timber. The dendroctonus bark beetles more or less confine their attacks to living trees, but even here it is the case that the epidemic has its source in attacks first made on trees of reduced vitality. Not only have utilization methods brought about such weakening in the timber stand, but also, as a result of forest fires much unfortunate damage has been done, not only in the value of timber lost, but in the weakening of the timber which remains.

Turning now to the question of fungus diseases, somewhat the same process of reasoning may be applied. It is not so generally known as it might and should be, that all rot in wood is brought about by the activities of various fungus plants. It matters not whether the wood consists of a tree, a fence post, a railway tie, a foundation sill, a factory floor, or whether it be simply a board lying in a damp situation upon a cellar floor—all rot that takes place in wood, results from the attacks of fungi, the development of which is brought about by the use of wood in an unpreserved condition, and in situations favourable to the development of these parasitic plants.

At the present time in the eastern provinces, and particularly on some of the pulpwood limits, considerable concern is now felt for the safety of the remaining balsam stand, owing to the widespread attack of fungus which destroys the heart of balsam trees. The rapid spread of this disease, and the intensity of its attack, may in large measure be attributed to the fact that until recently practically all balsam was left in the forest, until its proportion as a constituent of the forest became too great. By this means, the very food upon which this particular fungus found the optimum conditions for development was made available in concentrated quantities. Another instance of the same problem, exists in the extensive rot to which various species of poplar are subject. So long as this tree is confined to mixed stands where its numerical proportion is reasonable, the damage brought about by the fungi which attack it is not considerable. Wherever, however, poplar is found over extensive areas, in almost pure stands, it is at once patent to the most casual observer that by far the greater part of the trees are affected by a very destructive heart rot. Here again it may be stated, that the abnormal increase in these fungus attacks is brought about by the disturbance, accidental or otherwise, of natural timber conditions. In all too frequent instances, as a result of fire, the reproduction has consisted essentially in poplar growth, and in this manner almost pure stands of poplar have taken possession of areas previously occupied by several species. It is in such conditions as these, that the damage to poplar by fungi to which it is particularly susceptible is brought about.

It will therefore be perceived that there is a very intimate and very serious inter-relation in the attacks of insects and fungi, and that both of these are in large measure consequent upon faulty methods of utilization, and upon the occurrence of fires. We have, therefore, the three great agents in destruction of the forest, fire, insects and fungus decay, all of which operate to very seriously deplete the timber resources. There is, unfortunately, an insidious sequence

in the attacks of these forest enemies. First of all, due more frequently to human carelessness, fire occurs which kills outright much of the timber, and seriously damages or reduces the vitality of that which remains; divers insects attack both dead and dying trees causing great destruction; finally, by reason of the injuries to trees, caused by fire and insects, innumerable avenues are opened up for the ingress to the wood tissue of the spores of fungus plants.

With the subject of forest entomology and forest pathology, the Commission is manifestly not in a position to deal at any length. As previously stated, it is only comparatively recently that scientific study has been applied to those phases of forest protection, and it must naturally rest with the more technical bodies to develop the methods and means by which the severity of attacks of this kind may be moderated, and the forest rendered, so far as possible, impervious to the outbreaks of the unfortunate epidemics to which our forest resources have during the past generation been subject. In this regard, however, there is one thing which it is obviously the duty of the Commission to strongly impress upon the governments and upon the people, namely, that if any methods to control these insects and fungus attacks are to be found, they must naturally involve in some degree the modification of present methods in utilization of timber. Inasmuch as the troubles have been caused by lack of protection and imperfect methods of utilization, it is hardly reasonable to expect that any antidote or any method of treatment may be discovered which does not involve the modification of at least some phases in the methods now prevalent. Just as a physician, in prescribing some drug with which he may hope to allay the severity of some disease which has attacked the human body, must also prescribe strict dietetic requirements in order that the medicinal application may be permitted to have its proper effect, so must we be prepared to assist the forest entomologist and the forest pathologist in their efforts to devise means of control by giving reasonable heed to the requirements which they may place upon us in the improvement of methods under which the forest is exploited.

With this somewhat brief discussion of the problems which are, as a matter of fact, of outstanding importance in forestry development, we now pass to discussion of one of the most evident, one of the most widespread, causes of forest depletion—the forest fire, which agent is responsible, not only for manifold direct losses, but, as previously explained, is the primary cause of secondary and multifarious attacks by other agents.

FOREST FIRE PROTECTION

Owing to the fact that any plan of forest management must utterly fail, if adequate fire protection be not afforded; due to the fact that the damage caused by fire is about the first thing which strikes the eye upon the inspection of forest areas in almost any part of Canada, and to the deep-seated feeling that *something* must be done to control them; and due to the fact that appropriations provided for forest administration have in this country been so limited;—practically the first problem attacked by any forest organization on this continent, upon its inception, is that of fire protection. In fact, in the public mind the term “forestry” is to a large extent synonymous with “forest protection,” although the latter is but a small part of the former, and should not be construed as being the object of forest management; the public therefore expects expenditures to be in the main devoted to fire protection. As has been repeatedly stated, fire protection is a means to an end.

Moreover, the fire protection problem is not in itself susceptible of complete solution until some questions of forest utilization have first been dealt with. What would be the real value of the most modern city fire-fighting organization, if citizens were allowed to follow entirely their own inclinations in

SESSIONAL PAPER No. 310

the construction of buildings, or if they were permitted to maintain about such buildings conditions which are inimical to public safety? The statement is ventured that as much, if not actually more, has been accomplished in municipal fire protection, in the forestalling of conflagrations, by the stringent restrictions (imposed directly, by municipal fire laws, and indirectly, by insurance underwriters) as to buildings, and the manner in which the latter shall be constructed, heated, wired, maintained, etc., as by the development of fire brigades furnished with the complicated mechanical fire-fighting apparatus now to be found in every up-to-date city.

Nevertheless by reason of the serious fire losses which are sustained, and by reason of the extent to which they operate in the depletion of the forest resources, fire protection is undoubtedly the problem to which the greatest amount of time and effort must be given, and upon which the larger portion of funds available must be expended. Although there has during the course of the past ten or more years, been notable development in organization for fire protection, made possible very largely by increased appropriations provided by various governments for this purpose, the Commission considers one thing as being perfectly obvious, namely, that until the problem of fire protection is to a much more satisfactory extent solved, the efforts directed at, and the money to be expended upon, forest protection must inevitably be increased.

There are two things in Canada to-day which make the attainment of success in fire protection difficult: (a) careless exploitation, and (b) inadequate organization for fire prevention and control. Insofar as the first of these may, within the limits of economic conditions, be improved, even at greater final cost of the wood product, the solution of the fire protection problem will to that extent be simplified; as for the second, on fire protection itself, also, there must be greater direct expenditure both for preventive operations, and for more adequate measures of control.

Frequently one encounters an expression of the opinion: "the more money we spend in fire protection, the more fires we seem to have." The more accurate statement in the premises is: "the more we spend in fire protection, and the further we go in organization for that purpose, the more fires we locate and fight which formerly would not have received any attention whatsoever, and the more the timber that is saved to the country". Frequently occasion is taken to cite instances where, after the expenditure of the large sums in fire-fighting, and where as the result of adverse climatic conditions, fires considered to have been brought under control have broken away again, and spread over large areas; and to express the opinion that such cases are clear evidence that "nothing can be done in the control of forest fires, until the rain comes." In such hasty conclusions, however, the fact is more frequently entirely overlooked that, even when fires that have apparently been under temporary control do break out again and run over considerable additional areas, their possible aggregate area has been reduced by at least the area over which the fire could have spread during the period of time for which it was temporarily held in subjection; indeed, owing to the accumulative proclivities of fires, the area saved is generally much greater. Moreover, it may seriously be stated that the public impression as to what can be done in the control of serious forest fire is more frequently reached in rather glaring ignorance of the results which can be, and which have frequently been, attained by those forest organizations that have given proper attention to the detailed study of modern methods of fire prevention, detection, and control. Nothing can be more disconcerting to a foreman in charge of the fire job, than the expression, by some member of his crew, that "nothing can be done," when perhaps at the very moment when he vents such an opinion, there may be in operation some work definitely leading to successful control. Such expressions, however, are by no means confined to persons working on the fire line,—more

often than not, desiring to get away from it—they constitute one of the most serious psychological processes of the public mind with which fire protection organizations have to contend.

It would be much more appropriate, much more constructive and manifestly more helpful, if governments and the public would recognize at the start that, beset with difficulties though it may be, the forest fire problem is susceptible of solution; and that its solution depends in larger measure upon public support and upon government interest in development of protection organizations, than it does on the inherent difficulties of the problem itself. If in the year 1914, the people of Canada had been faced with the statement that during the course of the Great War they would be called upon to expend the sum of two or three billion dollars, very naturally there would have been many to say that it simply could not be done. Canada's gross effort during the great war was not exclusively the result of an outburst of patriotism in 1914; rather it was the result of the continuous development of feeling on the part of her people that upon the result of the great struggle in Europe depended the continuance of her position as a member of the Great Commonwealth of Nations. Little was it realized in 1914, how deeply the tumultuous conditions in Europe struck at the foundations of our Empire connections. During the course of those trying years, however, and the more heavy the burden of the undertaking became, the more insistent became public sentiment and public demand for continuance of the great effort until success should be attained. With such sentiments—poorly expressed though they may be—Canada was imbued, in a problem that might well have struck terror to her people.

In the forest fire situation lies a condition which, so far as our material wealth is concerned indeed strikes at the roots of our prosperity. What is really needed in the present dilemma is a thorough awakening upon the part of the people, and upon the part of the administrations put into power by people of this country, to the fact that if we are to continue for very much longer as a supplier of softwood products to the needs of the world, we are simply compelled to approach the forest fire problem in a very much more intensive and more constructive manner, even though this may involve saddling ourselves with increased expenditures, which are so necessary to adequate solution of the forest fire problem.

FOREST FIRE HAZARDS

The importance of forest fire protection is something which, although not yet fully apprehended, is more and more enforcing itself upon the attention of the people and of the governments in Canada. This results from the widespread damage which has in nearly every region been experienced, and also from the heavy losses, both in life and property, which have at times been sustained by sufferers in forested tracts. When it is stated that 90 per cent of all the forest fires occurring in this country are caused by human agencies, and are therefore preventable, it is at once obvious that vigorous steps are required to improve our methods of fire prevention. Entirely aside from the concrete damage actually sustained, forest fires so militate against the practice of forestry that no proper management can be instituted until satisfactory methods of fire protection have been devised and applied. The danger of total loss through forest fire, to which various tracts of timber are subject, constitutes the greatest single deterrent to the practice of forest management, not only by the state, but by private individuals or corporations on whom must depend to a very considerable extent continuous production of timber on forest lands.

The experience of Canada on this important subject is not by any means unique; on the contrary, it pretty well conforms to the general laws of evolution in forest policy as evidenced in the development of civilized nations throughout

SESSIONAL PAPER No. 310

the world. In this country we are, after all, still passing through the pioneer stage; settlement is still advancing step by step, into the wilderness, the land being claimed for agriculture by the use of axe and fire. For several generations the fight to win homes from the forest has been waged and, as explained elsewhere, there still remains in the minds of certain elements in the community what may be perhaps an inherited subconscious antagonism to the forest. The unfortunate feature of the situation just described is that this attitude is evidenced more particularly in that part of the population which is in close proximity to the forest, and which is hence in a position, either through malicious intention or through carelessness, to do the greatest damage to the forest. In treatment of this element of the national forest fire hazard there lies a problem in education which merits the most serious consideration and the most conscientious endeavour of every organization and every individual whose effort may be brought to bear in its solution. If there is to be any reasonable amount of timber left in Canada at all, we must do far more than await the serious consequences of catastrophes to impress upon the people the necessity for exercising adequate precautions. Truly, we must anticipate the occurrence of holocausts, and by the application of preventive measures we must render them impossible.

From the standpoint of forest conservation, forest protection is pure insurance against loss through fire of capital stock in soil and timber. If, therefore, the "premiums" to be paid for such insurance are to be kept within reasonable limits, it is essential that they should be applied as far as possible in providing for fire protection on lands which are to be assigned permanently to timber production. The fundamental necessity for statutory dedication of true forest lands has already been dealt with in detail; suffice it to note here, that in fire protection just as much as in any other phase of forestry the situation calls for permanent forest reservation, in order that proper methods of and facilities for protection may be installed. On such areas, there should be concentrated the great bulk of expenditure in money and in effort; after all, it is on these areas that we propose at least some more rational plan of forestry than has heretofore been practised in Canada.

There is, after all, some limit to the funds which can be provided for fire protection. Relatively speaking, our population is small, and neither it nor the population which may be expected within the next generation could support the enormous expenditures which would be required to provide adequate fire protection on the entire forest area. While no part of the forest area can justifiably be entirely neglected, it is therefore quite logical to apply the greater part of our fire protection expenditures to areas of greater timber value. The term "timber value" is not restricted, however, to the existence of heavy stands of timber presently merchantable. An adolescent stand of timber situated within reasonable proximity to forest industries represents much greater value than does a magnificent stand located in some remote quarter of the hinterland. While it is true that by reason of development in transportation facilities, the latter may in years to come become more valuable, the adolescent stand of timber in the more accessible location should manifestly be the object of the more serious effort in forest protection.

During the course of its enquiry the Commission has had brought to its attention the fact that the various authorities in this country are now giving more careful consideration to this principle of proper regional application of public funds appropriated for forest protection work. Although it is urged that in no case should forested areas be left entirely without some form of protection, even if it be restricted to prevention work, the Commission nevertheless strongly endorses, as an economic necessity, the principle that the greater part of the funds available should be expended in the protection of both mature timber and young growth in regions of relative accessibility.

It has previously been stated that at least 90 per cent of the forest fires are caused by human agencies. Before proceeding further with our discussion, it will be helpful to consider the relative importance of these various agents. Over a five year period, 1918-1922, there occurred in Canada an average of some 5,800 forest fires per year. Over one-third of these exceeded ten acres before being extinguished. As regards the causes, it is an unfortunate feature of the situation in Canada that for about one-quarter of the fires which occur it is impossible to determine the origin; setting aside those for which the cause is unknown, however, the various factors in the cause of fires, and the relative position attributed to them, is as follows:—

Cause	Percentage occurrence
Railways.....	26
Campers.....	24
Settlers burning slash.....	22
Lightning.....	10
Lumbering.....	9
Known causes not specified.....	6
Incendiary.....	3
Total.....	100

(a) RAILWAYS

In former years very large numbers of fires, and much of the timber damage incurred, were attributed to the operation of railways. During the past twelve years, however, by reason of excellent regulations furnished through the aegis of the Board of Railway Commissioners, the railway fire situation has been vastly improved. To-day, the railways, instead of being one of the most important factors in fire damage, as they formerly were, are far less destructive than are some of the other factors. Although railways are found to head the list in the table above, it must be pointed out that by reason of the fixed nature of the hazard, and the special protective measures which are taken to combat it, there is a far larger percentage of incipient fires along railway lines which are successfully extinguished before any appreciable damage is done. Therefore, large though the total number of railway fires may be, the total damage therefrom does not in any way approach the destruction wrought by fires from other causes.

(b) CAMPERS, HUNTERS, FISHERMEN, ETC.

Campers' fires—which class includes neglected camp-fires, travellers' and hunters' fires, etc.—are second in the above list, although in point of damage they stand pre-eminently at the top. Unfortunately, the public at large has not the slightest comprehension as to the number of fires caused from this source or of the untold damage resulting from inexperience or utter carelessness of this class of forest user. By reason of the fact that the hazard obtaining in this class is not a fixed one, as in the case of railways, but is, rather, subject to the most erratic fluctuations both in degree and location, it is one for which successful preventive and control measures require the most careful, the most intensive, the most mobile, and the most alert protective organization which can be devised.

While fires from this source have always offered the greatest difficulties in forest protection work, it is scarcely realized, perhaps, what an important factor the advent of such a necessary and useful acquisition as the automobile has played in increasing the fires in this category. Formerly, relatively a small proportion of the population could make use of the forest areas, and when they did so there was a certain amount of stability and regularity in their movements while in the forest; they were relatively easy to keep track of.

SESSIONAL PAPER No. 310

With the introduction of the automobile, however, there came the means by which a much larger proportion of the people might pay fleeting visits to timbered regions, stopping at one point or another for very brief intervals, and in almost every case, if not actually making use of a camp fire, at least almost always having resort to the use of matches for smoking, for smudges, or for sundry other purposes which provide opportunity for carelessness, and a liability to forest fires.

While, on the one hand, the number and intensity of fires caused by other agents may have remained more or less stationary, or in some cases may even have decreased, notwithstanding the great increase in the amount and efficiency of propaganda directed toward the prevention of fires due to campers, etc., their numbers still increase. Whereas in bygone years, the average citizen gave little thought to visiting the woods; in these days, few are those who, if they can in any way manage it, do not get back into the timbered areas,—for fishing, hunting, picnicking, or, even just to get there! Something assuredly must be done to stem the tide of destruction that the ignorance or carelessness exhibited by these people causes. It is a most unfortunate feature of the situation that many of them do not even realize that forest fires have the slightest effect upon their own position; they apparently ignore, as something entirely extraneous to their own life and contributing in no manner to their well-being, the success of forest industries which stake their future upon a continuity in wood supplies.

(c) SETTLEMENT

It is almost unnecessary to again refer to the vital part our methods of settlement may play either in forest protection or forest destruction. As explained in Chapter III, there are many instances in which indiscriminate and unguided settlement have resulted, not only in improper selection of lands, but also in the destruction of adjacent timber resources. Therefore, in so far as it may be possible for the governments of the day to definitely control settlement in forested regions, and to apply to such settlement activities those provisions which will ensure safety to the timber stand, a very important and far-reaching contribution will be made to the preservation of the forest wealth of this country.

(d) SETTLERS' AND LOGGING SLASH

Fire hazard may be appropriately divided into two main classes; the invisible and the visible. As typical of the "invisible" hazard we have campers, travellers, hunters, and so on,—including all transient or itinerant forest users; any one of these may at a dangerous time unconsciously or carelessly commit, or omit, some act and thereby cause a forest fire. On the other hand, typifying the "visible" hazard, we have settlers' slash, or logging slash, either one of which very greatly multiplies the danger of the invisible hazard. Settlers' slash fires, that is, fires resulting from land-clearing operations, account for over one-fifth of the forest fires in Canada; there is not a province where in greater or lesser degree this serious hazard does not apply. It may not be within the scope of forest service activities to determine the relative merits and demerits of clearing land by the use of fire, more particularly broadcast fires; in some cases there are arguments that it is not nearly so effective as it is believed to be; but again, in other cases, there is no other known practical method of getting rid of the huge accumulations of slash consequent upon land-clearing operations. Be that as it may, so long as undisposed-of slash remains on areas within or contiguous to timber land, there is a very evident hazard, which must in some manner be met.

In the same category is slash resulting from road construction. Too frequently, large sums of money are expended in the building of expensive roads traversing forest districts, without making provision for the disposal of slash and debris which is not only unsightly, but, subject as roads are to constant travel, creates a menace that in many instances has given rise to serious conflagrations.

So far as settlers' slash is concerned, there is an obvious necessity to get it off the land in some manner; it cannot be simply moved to adjacent areas, so almost invariably it is burned. So long as the fire is kept within control upon his own land, any damage which may be occasioned thereto is a matter which concerns only the settler. On the other hand, with logging slash, aside from reducing fire danger, there are few who conceive of any necessity for getting the slash out of the way; in other words, the incentive which exists in land-clearing to complete the job, in order that the land may be properly used in agriculture, is lacking. Setting aside, for the moment, any purposes other than fire prevention which might be served by the disposal of logging slash, let us first deal with the latter on the basis of its utility as a fire protection measure.

To begin with, there are those who, being fundamentally opposed to slash disposal, start off with the dogmatic statement that the process accomplishes nothing even in fire prevention. While many would consider it unnecessary to argue that point, expressions of such opinions are so prevalent that the issue cannot be avoided. As against such views it should be only necessary to ask: if slash disposal accomplishes nothing, why does practically any person engaged in forest activities find it to his interest, regardless of any legal requirements to clean up the slash around his camps or other works? Is it *only* for the purpose of preventing fire from spreading from his camps to the timber, or is it also a measure of protection to the camp itself? Whichever it may be, or if it be *both*, there is the clear admission of the fact that slash is a very dangerous factor in the spread of fire—unless the claim be made that such clearings are made for the purpose of beautifying the landscape!

Strange though it may appear, the Commission has had arguments placed before it—also, it need hardly be said, by those fundamentally opposed to slash disposal—that the leaving of slash in the woods is not only in no way opposed to principles of fire prevention, but that it is actually beneficial to the area upon which it is allowed to remain by furnishing fertilizer to the soil. One would perhaps be equally justified in taking the stand that reaping machinery used on the farms should be so constructed that it would remove only the head or the top few inches of the grain stalks, in order that the straw might be left to be ploughed in for fertilizer. It is not argued that wood in a state of disintegration does not add humus to the soil; rather, that the forest by the natural decay of roots, leaves, small twigs and herbaceous growth, is abundantly supplied with the requisites for the accumulation of humus without adding thereto those portions of the tree which of all its parts take the longest time to decay. Such an argument is obviously futile, and manifestly is advanced not as a concrete proposal for the betterment of soil conditions within the forest, but as an expedient to controvert any utility that may lie in the practice of brush disposal in other directions.

Still others argue that in the natural forest there is an accumulation of brush and other debris resulting from natural causes such as the death of trees. This is in many cases quite true, particularly in forests that are over-mature; in fact the farther the timber is beyond maturity, the more heavy the accumulation of this natural debris. But can it be argued that the latter condition entails no danger? Nothing is to be gained by citing the fact that before the advent of man the forests grew, the old trees died, they were replaced by young growth,

SESSIONAL PAPER No. 310

with a certain amount of debris at all times present,—and fires were then infrequent; and consequently, natural debris is not dangerous. The hypothesis accurately represents conditions, but the conclusion is unsound, in that it fails in recognizing the importance of the injection of man into the situation; it fails in appreciation of the “invisible” hazard to which forests are in modern times subjected. Moreover, as will in the succeeding chapter be pointed out, in the practice of allowing forests to become over-mature, there is an utter lack in observance of the principles of conservation; the time has most certainly passed when we may justifiably base arguments for present-day methods upon conditions which existed in the forests of by-gone years. Assuming that in our program of conservation, there are removed those over-mature forests which do exhibit tendency towards unfavourable fire conditions, can it be argued that in the near-mature or mature forest the debris conditions may in any way be compared to the slash conditions which are the inevitable result of logging operations?

It must surely be admitted that the presence of logging slash without any question whatsoever constitutes a serious hazard. While it may be argued that the slash cannot in itself cause fire; that the presence of an agent to kindle fire is essential to the occurrence of such a misfortune; the bald fact remains, that if a fire does start in close proximity to slash, the latter is one of the quickest, most intensive, and most certain means by which it may spread to valuable timber which may be adjacent thereto. If exception be taken to the veracity of the last statement, it is only necessary to consider character of forest fires, and experience with them throughout the Dominion. In various parts of the country it is a relatively simple matter to find evidence of fires which, although not in all cases occurring before the advent of man, most certainly preceded the accumulation of slash from logging operations. The date and the extent of these fires is written in the fire-scars found upon trees which survived. In such cases, one of the remarkable features revealed is the relatively large number of trees which did so survive, clearly indicative of the fact that the fire was not intense. To all practical purposes, it is only the ground fire that trees can survive. Even to-day, when fires occur in mature natural timber, or even in the over-mature stands, which have in no way been affected by the accumulation of logging slash, the intensity of the fire is not ordinarily great; indeed, very frequently it runs only on the ground. With the foregoing conditions, compare the effects and intensity of present-day fires, more frequently started in or near logging slash; once the fire hits the slashing it does not even require a chance wind to carry it into the crowns of resinous trees; the slash in itself provides the means by which it does so.

It is absolutely the experience of fire-fighting organizations that the fire which occurs in or reaches logging slash is the one which almost invariably gets into the crowns of the trees, where it requires only a wind—the latter frequently caused by atmospheric changes brought about by the fire itself—to carry it through the crowns, over wide stretches of timbered country, killing every vestige of timber and other vegetable growth which lies in its path, and leaving in its wake only charred rampikes which in short order become the prey of wood-boring insects that complete the work of destruction, leaving useless an area that previously was capable of contributing the raw materials of industries that otherwise would thrive.

Let us face the issue; let us at least frankly admit what is obviously, and what has absolutely been demonstrated by experience to be, an incontrovertible fact—that logging slash, road construction slash, settlers’ slash, any conceivable kind of slash, in, adjacent, or within any reasonable proximity to timber lands which have present or future value, is a hazard which plays a most important part in our forest protection problem, both in the phases of prevention and

control. Altogether aside from what we may be willing or able to do to counteract the condition, if we cannot admit that slash constitutes a serious hazard, we must utterly deny to our own dearly bought experience that which is its due; we must ignore the experience of forest organizations and forest users throughout the world.

For those who truly realize and admit the seriousness of the slash problem, it is in the decision as to what can be done, what should be done, and how it will be done, that the main differences of opinion lie. The two primary arguments advanced against brush disposal are the cost, and the danger which some methods of brush disposal may entail in the forest.

Before proceeding further with the argument, we may indulge in homely analogy, which is nevertheless very much apropos, and may conduce to a more impartial consideration of the slash problem. After having moved into a new house; having unpacked his effects in the kitchen, in the back shed, or upon the back stoop, having in the process relegated to the back yard the waste paper, excelsior and other miscellaneous riff-raff incidental to such operation, it finally dawns upon the performer that there has accumulated in the said yard a fire hazard of somewhat serious proportions. In so doing, he may or may not have broken the law; likewise, he may or may not be very seriously concerned with that phase of the question. He does realize, however, that the hazard is there; and, moreover, although he may be completely convinced that the rubbish will not of itself take fire, his fear is in no manner assuaged by any belief that he would not really be responsible if someone else happened to drop a match or to throw a burning cigar into it. No, unless he is entirely lacking in any sense of self-protection, to say nothing of the safety of the property of others, he sets about to devise the ways and means of removing the hazard. He cannot with safety engage in a broadcast burn; that might result in something more serious. On the assumption that the hazard must be entirely removed, he would have but two practical alternatives; (1) to cart the rubbish away, or (2) to pile it and burn it. It is needless to discuss the various means by which it could be carted away, so let that alternative be put aside. Let us now presume that in the other alternative,—piling and burning—he still entertains considerable fear as to fire spreading and causing other damage. If, however, he must be entirely rid of the nuisance by other means than its complete removal from the premises, his only solution lies in collecting the rubbish in one or more piles and setting fire to it; or in starting a small fire in a safe position and gradually destroying the waste. If, however, he suffers such serious apprehensions, that he is too afraid to use fire, his next best effort is to collect the rubbish in a compact pile or piles and leave it there. Although the latter process may not entirely remove the hazard, he has nevertheless reduced it an hundred-fold, and he may await the day when, climatic conditions being propitious, his reviving courage may prevail upon him to complete the job and entirely remove all hazard by burning. Although, indeed, the latter day might never come, the fact remains that he has in great measure reduced the hazard, and he therefore lives in greater security, and in freedom from insistent calls from neighbours, and fire or police departments, exhorting him to "clean up."

It may at once be perceived that essential to the sequence of events portrayed is the fundamental recognition that the original hazard exists. If that be not recognized by the individual himself, it will be very vividly recognized for him by others. Let us study the process of reasoning displayed by the other people. Do they say "Here is an increased fire hazard which threatens at least an entire city block; let us double our fire brigade and fire equipment!" If such illogical reasoning were applied in any city, and fire hazards allowed to develop, it would unquestionably be followed forthwith by the decision of

SESSIONAL PAPER No. 310

underwriters that the insurance premiums must also be increased; generally, all round, there would be not only the increased hazard, but it would directly affect the people in other directions to their serious financial disadvantage.

We may concede that in the analogy the case outlined may involve a greater degree of fire hazard in the physical sense; that is, the menace of fire may be greater than is the case with woods' slash,—in that paper and excelsior may be more inflammable than logging debris, and also the prevalence in the town of so many factors in the cause of fire. Fire hazard, however, involves more than these two physical conditions; in determination of hazard there must be considered the value of property endangered, and also the degree to which protection organization is developed to control fires which occur. In the up-to-date town, on account of the concentration of property values, the organization for protection is very highly developed, and the fire hazard is by that means reduced. In the forest, on the other hand, while values may not be so concentrated, neither is the protective machinery so highly developed nor so well equipped. Even admitting the greater inflammability of the back-yard rubbish, therefore, there is not quite so great a difference between the net hazard thereof and that which exists in the logging slash, as might at first be supposed.

Inasmuch as the disposal of logging slash, if it is to be brought about at all, is definitely linked up with the process of forest utilization, further discussion as to what is being done in this direction in Canada, and what may further be done, will be dealt with in the ensuing chapter when timber administration is under discussion. In the present discussion, treatment is necessarily confined to slash as a factor in the forest fire hazard.

It is thought that the foregoing remarks may in some degree serve to "clear the decks" in a subject which has entailed many acrimonious debates, even quarrels. Whether or not it may under conditions existing in this country be economically possible to dispose of logging slash is, at the moment, beside the point. The desire is to remove from the public mind any inaccurate impression which may have there been formed that logging slash does not contribute to the fire hazard, or that it does not increase the expenditures which must be made on fire protection to offset the hazard so occasioned. Beyond question it does! No matter what argument may be brought to bear to offset the possibility of requirements for slash disposal, the bald, incontrovertible fact is that the hazard exists; admitting the omnipresence of the contributing invisible hazard—the camp-fire, the smoker, the hunter—the slash itself constitutes one of the most serious dangers with which logged-over and adjacent forest areas are beset.

From the standpoint of fire protection, there are variations in methods which are applied or have been suggested for slash disposal, but in the controversy so far waged on the subject there has, as previously explained, been a tendency to minimize a danger where the process of magnifying could much more appropriately be applied. On occasion, the same persons who have argued with great energy that the slash is not a hazard, have almost in the same breath admitted that it should be carried out along trails, tote roads, and in such places where the invisible hazard is liable to assert itself. On other occasions, those who have declaimed against the existence of any hazard in slash have, even if unwilling perhaps, admitted the desirability of the lopping of slash, in order that the brush might more rapidly disappear as a result of decay.

As previously intimated, one of the more frequent arguments against slash disposal is the danger which the stage of burning might impose upon the surrounding forest. Those who advance such arguments, however, seldom stop to consider how very greatly the hazard may be reduced, even if the debris be properly piled and left without being burned.

There is the class who insist that the damage of slash exists only for one or at most two years, when in almost any part of this country there may be found logging slash that after six, eight or even ten years still exhibits a high degree of inflammability, and merely requires the kindling spark to make it react all too quickly and completely. Still others have argued that when the slash is green—even the slash of coniferous trees—it is not very inflammable, utterly ignoring the fact that every year there occur fires that travel for miles in the tops of living trees, and that the condition which makes this possible is the exceedingly resinous nature of coniferous vegetation.

Manifestly, such arguments are rather seriously characterized by subterfuge. If we are to argue for or against slash disposal, let the argument be upon the basis of facts, rather than upon suppositions that lack foundation; let it be on the basis of the costs of the operation and economic feasibility, rather than upon an unreasoned desire simply to avoid it. And in gauging the practicability of those costs, let us not forget that, if we do not assume the burden, we have in any case other alternative expenditures to meet, (1) an inevitable increase in the outlay for securing adequate fire protection, and (2) an ultimate added expenditure, either in stumpage or in operation costs, due to the reduction in timber supplies through fires and the necessity for going farther afield for wood supplies occasioned by fire depletion.

(e) MISCELLANEOUS HAZARDS

There are other elements in the forest fire hazard of the country, some of them more prevalent in certain districts than in others. Lightning, for instance, is claimed as causing 10 per cent of the fires of which the origin is known. This figure is reached, however, not as a result of prevalence of extreme lightning hazard throughout the Dominion, rather there are certain areas where, on account of frequent dry electric storms, many fires are started from this source. As a general rule, in districts not subject to such storms, the fire occasioned by lightning is more frequently extinguished by the rain which accompanies the storm. Obviously, nothing can be done to forestall the occurrence of lightning fires; only in the development of quick detection facilities and organization for rapid control, in areas subject to this special hazard, lies the possibility for action.

Undoubtedly, many fires are caused by incendiarism. In some cases the purpose is purely malicious in character; in others, it may be for the attainment of some secondary object such as increasing the growth of forage plants, for grazing purposes; in still others, it may be for the purpose merely of securing a job on the fire-line, the organization of which is necessary to combat the fire. Whatever the underlying motive may be, incendiarism is a hazard that must definitely be reckoned with, and every effort directed at its curtailment, both by educational propaganda to demonstrate the economic losses which are involved in forest fires, and in the application of stringent legal measures for the penalizing of those who may engage in this insidious practice.

ORGANIZATION FOR FIRE PROTECTION

The work of fire protection may be appropriately divided into three distinct phases, prevention, detection and control. The success of any organization in the entire problem depends very largely upon the degree to which it recognizes the important features of the problems presented in each of these three phases, and upon the discretion and effort which it displays in the specialization of its organization to meet those special requirements. Unfortunately, largely by force of circumstances in this country, most of the organizations that have been

SESSIONAL PAPER No. 310

developed have had to first concentrate their attack upon the problems of fire control. As a matter of fact, more frequently the first stage in development of fire protection staff has been in the appointment of voluntary or per diem fire rangers, whose services were merely called upon in event of the outbreak of fire. The next stage is in the appointment of seasonal rangers, who, although carrying on a certain amount of prevention and detection work, are in many instances forced to temporarily neglect these phases in order to directly attack problems of control.

While it has been the experience and effort of all such services to endeavour to meet the demands of each individual phase of the problem, it is unfortunately the case that about as rapidly as the organization could be developed, the fire hazard itself, and the actual number of fires, have very greatly increased. The situation is, therefore, that there is no protection organization in the country that has yet solved to a sufficient extent the problems of prevention; of detection, it may be said that although in certain regions the equipment and staff to perform this function with reasonable efficiency have been provided, this is not the case generally throughout the Dominion.

FIRE PREVENTION

It is not our purpose to deal with the subject of fire prevention in any detail, as at least the more efficient forest protective organizations have a clear conception as to the manifold duties and requirements essential to preventing fires. Of greater importance, at the moment, is expression of the conviction that the forest service must primarily be provided with a good fire act, which not only makes provision for penalties which will be commensurate with the offense of starting forest fires, but will also give the service thorough legal basis whereby, in danger periods at least, it may thoroughly control all travel through forested regions, and may have supervision of all phases of forest use which have bearing upon the fire hazard. In some of the provinces excellent legislation has been provided leading to the control of transients in the forest, and the working out of details to make such legislation effective is manifestly the duty of the protective service. The extent to which the service has gone or may go in controlling this invisible fire hazard may in large measure be used as a criterion of the success of the organization in fire prevention work.

Coupled with the control of forest travellers and forest users, there must be provisions ensuring that various operations consequent upon settlement which takes place adjacent to and in the vicinity of forest areas, should be subjected to adequate control.

Perhaps more important than all, in fire prevention activities, however, is the necessity of carrying on through every possible channel a persistent propaganda calculated to inform the people who live near, or have occasion to visit the forested regions. This work must even be extended to the towns and cities where perhaps even a relatively large part of the population may never have the opportunity to visit the woods. The latter is essential in view of the fact that there exists in this country the most pressing necessity for thoroughly awakening the people as to the importance of forest industry in our economic life, and consequently the urgent necessity which exists for protecting the timber supplies which are essential to the continuance of such industries. This educational campaign has been, and must continue to be, persistently carried out in the schools, churches, recreation clubs, boards of trade,—in fact, in every conceivable institution or organization wherein questions which concern the public good are considered and discussed.

FIRE DETECTION

The pioneer form of fire protection consisted in the assignment of a man to a specific part of the forest with the duty of travelling about trying to prevent the occurrence of fire; in his travels to act as the agent of detection; and, finally, upon noting a fire to go about the process of extinguishing it either himself or by the organization of a crew sufficient to accomplish that purpose. Very obviously when these three functions are centered in the one man, when the situation is such as to demand his entire attention in exercising one of them—control, for example—the phases of prevention and detection must necessarily be left entirely in a state of suspense. While a fire ranger may be actually extinguishing a fire somewhere in his district, there may in another quarter of the district be some transient party whose movements require careful watching, or indeed, there may actually be a fire starting for which there is no person to function in detection. This fundamental drawback to concentration of all phases in the one individual, or a group of men, in the fire protection organization, has led in all cases to at least the realization that special measures are required for fire detection. In such services and such forest regions where development has got beyond the stage of infancy, the function of detection is exercised by a separate unit which operates almost exclusively for that purpose. Where complete lookout systems have been established, the lookout men so employed are required at all times to be on their towers or in their mountain cabins for the sole purpose of detecting incipient fires, and also for the purpose of reporting from time to time upon the progress made on fires which are being fought by the control staff. The function of fire detection is also exercised by patrolmen on horse-back, on foot, in canoes, in motor boats, on railway speeders, etc., etc.

Owing to the rapid development of aircraft during the war, great interest has been displayed in the use of this kind of equipment for the purpose of fire detection in forested regions. In the public mind there has arisen perhaps the belief that in aircraft lies the final solution of the forest fire troubles. Although experience tends to show that there is a most important purpose which such equipment can serve in forest protection work, it is, nevertheless, the case that the use to which aircraft can legitimately and successfully be put in fire operations is much more limited than it is by many believed to be.

Taken by and large, in a district which offers suitable topographic conditions and facilities for the establishment of a fixed lookout system properly equipped with the means of rapid communication by telephone, or by other means, the lookout system perhaps offers the greatest possibilities for successful fire detection. In reaching this conclusion, the question of relative cost must obviously be taken into consideration; it is not merely an expression of opinion, it is the result of actual experience after trial of both methods.

There are, however, vast areas, particularly in the northern parts of the eastern provinces and the prairie provinces, where topographic conditions render extremely difficult the installation of lookout systems and the necessary facilities for rapid communication essential thereto. More generally such areas are interlaced with a system of lakes and rivers which, although offering excellent means of getting about from place to place, still offer difficulties in construction work, and indeed offer a considerable obstruction to the rapid transport of large bodies of men and supplies. It is in these areas that there lies the greatest opportunity for the use of aircraft in fire detection. As a matter of fact, they are being so used in various parts of the Dominion, and it entirely depends upon the question of cost whether it will be possible to continue this method of fire detection. Obviously the operation of aircraft entails large expenditure for machines, for the establishment of bases, and for the provision of highly special-

SESSIONAL PAPER No. 310

ized personnel. Although excellent work has been performed in various parts of the country by the aircraft units assigned to fire detection, it cannot yet be said that full efficiency for the money expended has been secured, and it depends in large measure upon the confinement of expenditures to reasonable proportions, and the attainment of proper efficiency, whether aircraft will find a permanent place in forest protection work.

FIRE CONTROL

As previously explained, there is overlapping both in personnel and equipment as between the three phases of fire protection. Aircraft, for instance, in addition to being used for fire detection are on occasion very useful indeed in exercise of the function of control. One of the recent developments in forest fire-fighting equipment is the light-weight, high-power gas engine pump. Over a period of ten years or so this class of equipment has been highly specialized. The pumping outfits are readily susceptible of transportation by flying boat, and particularly in a lake country contribute greatly to the effectiveness of control. Manifestly, large crews of men cannot be transported by aircraft, for this would involve the use at one particular base of so many machines that the cost would be prohibitive. The use of light gas engine outfits has, however, made possible the use of much smaller fire crews, in many cases at least; and in some instances it has already been possible to transport by aircraft the portable pumps and the small number of men necessary to effect fire control.

Perhaps, however, one of the most useful purposes of aircraft in serving the function of control lies in the transportation "overhead" from one point to another. Not only are supervisory officers permitted to get rapidly from one part of their districts to another by this means, in a time of fire emergency, but expert fire-fighting foremen, of whom the number is all too limited, may be transported rapidly from place to place, and their services by this means brought to bear in different places. It is obvious that if the services of supervisory officials and fire-foremen can by rapid transportation be distributed over a greater area within which a fire emergency exists, it makes possible the application of greater experience over a larger area, in solution of the more intricate fire problems.

It will readily be perceived that the transportation of fire fighting crews, even to the extent of parties of from five to ten men, and of the equipment and supplies essential to their operation, involves the use of a type of machine very much larger, and consequently of much greater cost than is required in the provision of aircraft which serve only the function of fire detection. Not only is the provision of aircraft of large carrying capacity much more expensive, but their operation entails the provision of base equipment and personnel very much more expensive than in the case of the smaller machines. Therefore, although these larger machines have been, and probably will continue to be, used to a certain extent in this direction, it is, nevertheless, the case that aircraft will more extensively be used in fire detection. Beyond that stage it is probable that in greater measure fire-control functions will be confined to the transportation of "overhead" as previously explained.

The foregoing discussion of aircraft has been related more particularly to the use of hydro-aircraft. If we now consider locations where flying machines of the land type are used, it will be even more clearly appreciated that, except for the transportation of "overhead", the function which may be served is essentially that of detection. This is thoroughly exemplified in the operations now being carried out in the southern part of the Rocky Mountains, where land machines only can be used, and where the function served is practically confined to fire detection, along with their utility in serving by their psychological effect the function of fire prevention.

As for other means of fire control, it may be stated that very great development has been made during the course of the last ten years. Prior to that time, upon the outbreak of fire, it was quite customary to witness the greatest kind of confusion and excitement when steps were being taken for the mobilization of a fire crew and transporting it to the scene of the fire. By the application of careful study in this problem, and the preparatory provisions which are made in order to facilitate mobilization, there is indeed a vast difference in the modern methods followed and the success attained in quickly getting a fire crew organized, equipped, provisioned and transported to the place where their services may be required.

So long as the services of per diem or of temporary men were depended upon for fire control the accompanying state of excitement and confusion previously described continued. It has only been as a result of the development of the permanent skeleton staff, made responsible for continuous preparation for fire emergencies, that any reasonable success has been attained. Very naturally, during the crisis of a fire season it is a very difficult matter to find time for careful study of the requirements, consequently, although actual work in fire detection and fire control may themselves be confined to the time of fire hazard, all those steps which lead to the better solution of the fire problems,—to wit, preparation—must necessarily be carried out at such times of the year when careful and calculated concentration may be given organization work. For this reason it may be stated that the extent to which a fire-fighting organization may display efficiency during the course of the summer, may in very large measure be attributed to the preparatory work in which they have engaged during the winter months.

Just as proper fire detection requires the installation of fire lookouts, aircraft, and rapid communication by means of telephone, so does the function of fire control demand the provision of adequate trail and road facilities over which fire-fighting forces may rapidly be transported. Furthermore, it demands the provision at strategic points of the various kinds of tools, equipment and other supplies required for the maintenance at various points of a body of men who, if they are to work satisfactorily in accomplishment of the object in view, must not only be properly equipped with the necessary tools and apparatus, but must also be properly provided with food supplies and temporary living quarters.

In preparations of this character, every forest protective organization which has shown reasonable signs of development now takes careful heed of the requirements previously outlined. It will therefore be seen that a somewhat remarkable change has been effected in conception of the intricacies of fire control work, as compared with the conception of ten or fifteen years ago. Although there are organizations in which the permanent skeleton staff is limited to a small percentage of that carried during the fire season, it is nevertheless true that in every case where any reasonable efficiency has been attained, some skeleton staff has been continuously on the job throughout the year devising the ways and means for conducting a successful campaign of fire protection over the lands which may come under its responsibilities.

The old conceptions of voluntary fire-fighting have in large measure disappeared, and in the present day it is rather thoroughly recognized that to secure proper efficiency on the fire line it is necessary that the force mobilized for fire-fighting operations must be compensated for services rendered. It is desirable that fire protection organizations should be vested with authority to commandeer the services of all able-bodied persons for the fighting of fires which may occur within the district; it is also only fair, and is conducive to the rendering of much more satisfactory work, that the services so commandeered be reasonably paid for. It may here be pointed out, however, that this

SESSIONAL PAPER No. 310

development has given rise to a situation, particularly in districts where unemployment is prevalent, where a certain type of man, in order to provide himself with employment, will on occasion resort to incendiarism. The seriousness of this situation is fully recognized by all services, and various steps have at different times been taken to offset or curtail it. By reason of the fact that in cases of incendiarism the very evidence upon which the perpetrator of the offence may be convicted is frequently destroyed in the fire, this phase of the problem renders very difficult indeed the apprehending of the culprit. On the other hand it has led to a feature in modern forest fire legislation which places the onus of proof upon the accused; it has also led to the provision of penalties which are in many instances much more commensurate with the offence than was in former years the case.

In the details for the betterment of organization for fire prevention, fire detection and fire control operations, the Commission manifestly can go no further than to strongly express the view that, owing to the very serious nature of the fire hazards existing in almost every part of Canada—there are few regions free from them—it is of transcendent importance that every possible assistance, both by way of legislative enactment and by financial support, should be given the various organizations whose duty it is to solve the very difficult problems that confront them. To the industries and to the forest services may well be left the detailed suggestions of better methods: the Commission can only urge that greater heed be given by the governments and by the people to such suggestions. One of the inherent defects of democratic government is that the governments cannot after all go very far in advance of public opinion. In the government which goes just so far as public opinion may of itself dictate, we have exemplified an administration which is essentially one of political expediency; in the government that definitely recognizes the necessity for some reform that may be some considerable distance in advance of public opinion, and takes steps to educate public opinion to that degree which permits of application of the reform, we have exemplified true statesmanship.

Into the fire problem, this latter requirement enters very strongly; such a large part of the population is so circumscribed in its activities and movements, that the people little realize how vitally the question of forest supplies affects them. Obviously, the governments, the forest services, and all other organizations that engage in patriotic work must shoulder the responsibility of enlightening and advancing public opinion, so that much more vigorous action may from a political standpoint be justified, in solution of the forest fire problem.

FIRE PROTECTIVE ORGANIZATIONS

It will, perhaps, be of interest to make a summary statement which will indicate the extent of forest fire protection organizations in various parts of Canada.

(a) NOVA SCOTIA

As has so often been stated, the timber lands of this province have in a large measure been alienated, and until very recently there was little effort displayed on the part of the government to take any vital interest in fire protection. It is true that there was legislation on the statute books which made provision for certain steps when fire emergencies arose. To a greater extent, however, this legislation was characterized by the fundamental weakness of depending altogether too much on voluntary and gratuitous service.

As a result of severe fire losses, however, the province a few years ago came to the realization of the fact that further action was necessary. Accordingly, a new act was passed, making provision for the appointment of an officer

who would give part of his attention to the special work of fire protection. Aside from the necessary office staff, however, the present organization in the province does not include any officers paid entirely by, and under exclusive responsibility to, the provincial fire officer. Although the organization now in effect is manifestly very much superior to that which preceded it, it has nevertheless the fundamental weakness inherent in any organization which is characterized by dual responsibilities. The present fire protection system is carried out to a large extent through the machinery of organized municipalities. Some eighteen or twenty chief fire rangers are appointed, one for each unit of the protective organization—whether it be for one municipality, for part of a municipality, or for the combination of two municipalities—these men operating under the general supervision of the Commissioner of Forests and Game. Such men are paid a retainer of a couple of hundred dollars a year by the government, and under authority of the government the men are vested with certain powers essential to the enforcement of the fire act.

Timber lands are assessed at the rate of one-half cent per acre, and by this means a forest protection fund is established for each municipality, from which all other expenses of fire protection work are defrayed by the municipality. In the first place, the latter organization assumes a responsibility for paying the chief ranger on a per diem basis for services rendered, and also defrays the cost of the services of assistant or sub-chief rangers whom the chief rangers may find it necessary to employ, together with the cost of the actual fire-fighting operations which it may be necessary to carry on. In the event of a deficit, additional funds have to be provided by the municipality; in the event of a surplus, the latter remains to the credit of the forest protection fund of the municipality.

In the province of Nova Scotia the fire hazard is not inordinately great. Settlement penetrates pretty well all parts of the mainland, and in greater or lesser degree, the areas of timber are interspersed with agricultural and fishing communities. For these reasons the problems of fire control are simplified. Topographical conditions naturally favour fire control work, inasmuch as there are numerous lakes and rivers, advantage of which may be taken in the control of fire. Still further, as to the timber itself, the forest type is essentially Acadian in character, that is, hardwoods enter to a considerable extent into the composition of the timber stand, and, being very much less inflammable than our conifers, the fire hazard is in that manner reduced. Finally, owing to the maritime situation, climatic conditions in the average year are such as to reduce the danger of fire; indeed, some parts of the province are so subject to high degrees of moisture that even during relatively dry periods the fire hazard is less accentuated than it otherwise would be. All of these things, therefore, contribute to a lessening of the fire hazard in Nova Scotia, as compared to other parts of Canada.

For these reasons, combined with the fact that so much of the timber is privately owned, there has previously not been the same incentive to more intensive or more complete government control in fire protection activities. Indeed, on some areas owned by the government, but leased for long periods of time to private corporations, the government has absolved the latter from contributions to the fire fund, and have permitted them to develop their own machinery for fire protection. In some such instances a very good work has been done, so that it can by no means be suggested that the system is entirely lacking in efficiency. Therefore, whether or not it might be better for the government itself to entirely control and supervise fire protection activities, there is still the strongly existing necessity that its interest and participation in work of this character should be very much more pronounced than is the case at the present time. As has previously been explained, the province of Nova Scotia does not

SESSIONAL PAPER No. 310

spend more than eight or ten thousand dollars in the protection of a resource which, even though essentially privately owned, is still the foundation of a timber industry which plays a most important part in the economic development of the province.

(b) NEW BRUNSWICK

In the province of New Brunswick, we deal with an area where fire hazards are very much more pronounced than is the case in Nova Scotia, and also, where owing to the control by the government of approximately one-half of the timber resources of the province, it has in the natural course of development been absolutely necessary that the provincial authorities should exemplify in a far greater measure an interest in and control of fire protection matters.

The forest service of the provincial administration exercises full control over fire protection activities except in one or two isolated cases where, owing to peculiar circumstances, arrangement has been made that fire protection should be administered through the machinery of local organizations. Broadly speaking, however, the great bulk of the timber lands of the province come directly under the control of the government forest protection service. Timber land owners and lessees are assessed at one-half cent per acre, and by this means a forest protection fund is raised and the financial means of carrying out forest protection work is supplied.

Although the experience of the past few years, and particularly that of 1923, has clearly demonstrated that the fire protective organization is not as yet sufficiently manned, equipped, or organized, to adequately control the forest fire situation, it is nevertheless true that there has been a vast improvement in the situation. For this province, it is only necessary to suggest that on the part of the administration and of the people, there is an urgent necessity for more general appreciation of the value of the forest resource in the life of the province. There is also an urgent necessity for the proper protection of that resource in order that it may continue to play its important part; and the more extensive provision of funds to permit of more adequate staff, the installation of more extensive equipment, and a greater degree of organization of all forest protection activities.

(c) QUEBEC

The situation in the province of Quebec has already been referred to in Chapter VI when treating of the forest authority. In this province, and particularly in those parts of it where timber lands have been permanently or temporarily disposed of to operating companies, fire protection has been carried on by associations of timber owners, especially developed for that purpose. Previously, all timber holders had contributed to the province, at stated rates per acre or per mile, funds which were expended by the latter in forest protection work. Being dissatisfied with the measure of control secured by this means, however, the timber-holders secured from the government permission to carry on, through organized associations, the protection work on their own lands. This was, of course, a very different development from simply permitting each individual holder of timber to carry on his own fire protection work. These associations rapidly have become both representative and comprehensive in character, and under their care, forest protection in the province of Quebec has been very materially advanced.

Just as formerly, however, the timber holders were not quite satisfied with the measure of control exercised by the government protective service so it has recently developed in the mind of the government protective service that possibly the forest protective associations were not exhibiting that degree of efficiency which the government authorities desired. The more recent development has

been, therefore, that the association plans for fire protection are to be subjected to careful review by the government, and in any case where it is evident that such plans are inadequate, provision is made that the government itself, through its protection service, will again take over fire protection operations. The present situation, therefore, places directly upon the associations the responsibility of justifying their existence by the efficiency of the forest protection which they may afford.

It has previously been demonstrated in detail that there is a very direct relation between forest protection and other phases of timber administration. It is, therefore, strongly to be urged that the arrangements recently made in this province, where the work of fire protection has to a certain extent been divorced from timber administration, shall not be permitted to operate in such a manner that fire protection and timber administration, which are inherently related, will not be so far separated, one from the other, that the true purpose of each, or both, may be so individualized that its true relation to the other may be obscured.

For those areas where the timber resources have not been disposed of in any manner, the government through its own service carries on the work of fire protection. In this province, therefore, we have exemplified two distinct methods of fire protection administration.

Although there is perhaps implied above some doubt as to ultimate efficacy of fire protection carried out by private bodies, it should be stated that the position of the Commission in this behalf is not dictated by a feeling that the inherent weaknesses of association control lies in a theory of the inability of private organizations to carry out the physical operations of fire protection work as efficiently as can government organizations; indeed, there are many who argue that through private enterprise greater efficiency can be attained. The inherent difficulty lies entirely in another direction. To a greater extent the soil rights of the great bulk of forest lands in this province, and in most of the other provinces, lies in the Crown; individuals or companies enjoying timber-cutting privileges are restricted to certain sizes and classes of timber. While the timber-holder displays no greater tendency to selfishness than do other classes, he would perhaps be not quite human if, in the protection of an area in which he has only a part interest, and a temporary interest, he did not incline to the more pronounced concern with, and more intensive protection of, that part which is more fully his own. Similarly, he would hardly be human if, while protecting his own interest, he failed to worry so much about adjacent lands, which, although not of material concern to him, are nevertheless a definite part of the timber wealth of the country.

In the expenditure of funds and effort, the timber holder is liable to consider as of greater concern to him, the merchantable timber to which by virtue of his license he has exclusive right. To argue that greater efforts should not be directed at the protection of the greater values would unquestionably constitute defiance of economic laws; yet, on the other hand, experience only too clearly shows a tendency on the part of timber-holders, perhaps, to be unappreciative fully of the potential value of young timber, particularly if it be not their own. Here again, it must be recognized that in the forest we are dealing, not with definite, fixed values which may be given to various parts of the timber stand, but with a living organism, to the regenerative and productive capacities of which there must be attributed the relative value which they merit, regardless of who may hold title to them.

Again, in carrying out the work of fire protection there are various provisions which must be made, which involve more or less the permanent use of land; telephone lines, lookouts, trails, roads, buildings, are all requisites of fire protection. Although, in this instance, also, private effort may be equally or more

SESSIONAL PAPER No. 310

efficient in the physical act of construction, there is nevertheless through this channel an accumulation of private property upon government lands which are, after all, only under more or less temporary alienation, which temporary alienations are, moreover, under the liability to frequent change in control. It is perhaps unnecessary to point out, also, that such improvements, if they are not actually of the nature of public utilities, must in many cases be connected up with, and made effective through, similar facilities which are essentially public works. It may here be conceded that the accumulation of private property on public lands, brought about through the activities of forest protective associations in Quebec, undoubtedly presents some difficulties in reversion to other methods, if it were deemed advisable to adopt a system of exclusive protection through government service.

The foregoing arguments notwithstanding, and aside from the respective merits of one form of protection or the other, it may be thoroughly conceded that the changes which have from time to time been made, and which of themselves may have portrayed a weakness in fundamental conception of the problem, are indicative at least of this: that there was a growing appreciation on the part of the industries, and of the governments, that more efficient protection was required. Of Quebec we may therefore say that very material progress has been made; private enterprise has acted to spur the government to greater interest, and, on the other hand, the government services have demanded more of private industry.

(d) ONTARIO

In the province of Ontario the function of fire protection has always been exercised in greater degree through the government service. Many years ago, when for the first time timber holders were assessed for part of the cost of the fire protection service, there was a demand from them that they should be permitted to select and use their own employees for the protection of timber lands under license or lease to them. This concession was granted by the government, but official appointments were made entirely through that part of the public administration which had responsibility for fire protection work. Later on, although official appointments still continued in the government service, licensees were called upon to pay the entire cost of protection on their limits. In other words, although the government performed the official act of appointing the men, vesting in them the authority essential to the performance of their duties, the licensees enjoyed exclusively the privilege of paying for their services. This system naturally led, over large areas, to the concentration of fire protection efforts to more valuable stands of timber and camp equipment, the property of licensees, and perhaps to somewhat extensive neglect of adjoining timber areas in which the licensees had no direct interest, or possibly considered that they contained little timber of potential value.

For unlicensed lands, the government itself developed an extensive, if somewhat unwieldy, system of fire-ranging which was above all things characterized by the temporary nature of appointments. At one time the province carried a staff of rangers varying from one thousand to twelve hundred men, while the permanent skeleton staff which would manifestly be necessary to the successful control of such a large staff was entirely lacking.

Under both of these methods, as might have been expected, serious difficulties arose, and the degree of efficiency obtained was by no means sufficient to meet the demands of the situation. In more recent years, therefore, the province, through its forest service, has definitely committed itself to, and engaged itself with, the organization of fire protection on a district basis, in which there is provided the permanent skeleton staff so necessary to the attainment of efficiency in fire protection work.

The Commission has also been apprised of the fact that the Ontario Forest Service has already gone in a most intensive way into the provision of all the modern fire-fighting equipment which has, by developments of recent years, been made available. Realizing also, the great difficulties of developing by ordinary methods a fire protection organization which will adequately control the fire situation in the north country, the province is undertaking a comprehensive plan of aircraft operations. It may merely be pointed out that, although greater concentration of fire protection effort should manifestly be applied in districts of high timber value and relative accessibility, there is danger in leaving too much unguarded the resources of the north country which, although now somewhat inaccessible, may in later years be called upon to offset the depletion which is taking place in the more accessible parts of the province. The use of aircraft cannot of itself solve all the problems of fire protection. More or less essential to success, even with aircraft facilities, is the maintenance of the ground force which may be used to act in unison with the air detection force.

Whereas, a few years ago, the province of Ontario, through its very large but entirely temporary fire ranging organization, probably expended more money per acre for fire protection, over very large tracts, than has been expended by other organizations on this continent over similarly large tracts, and, by reason of the lack of the skeleton permanent organizations, probably secured less efficiency than did some of the other organizations with more limited financial means at their disposal, the province is at least now embarked upon a fire protection organization in which some of the more vital principles essential to success are thoroughly recognized.

(e) BRITISH COLUMBIA

Notwithstanding the very high timber values in the province of British Columbia, it was not until 1912, under operation of the new Forest Act, that steps for efficient organization were taken. Prior to that time the fire protection work had been handled entirely through the operation of a loosely organized fire-ranging staff, consisting almost entirely of men hired seasonally, or even for shorter periods of time when the fire danger might be acute.

The Act of 1912, and the forest service created under it, both of which were the culmination of strong public sentiment and government appreciation of the necessity of taking further steps in forest protection, made possible the entire reorganization of the fire protection machinery. The province is divided into eight main forest districts in charge of each of which there is a district forester responsible for the conduct of fire protection and timber administration work for that district. One of the most important features in efficient fire protection organization lies in the necessity of close inspection and control of field operations. Whereas the fire rangers had formerly been more or less directly responsible to a head office situated at some considerable distance, the district organization brought the supervising office into close contact with the rangers' work. Such a condition not only operates to provide for better inspection and closer checking by more responsible officers of the forest service, but also, by bringing such officers into direct contact with the problems and difficulties of the forest ranger, induces a much better spirit of co-operation between the field and head offices; it slowly but surely works to the improvement of forest rangers who may have the inherent qualities of good rangers, and it just as surely eliminates from the staff the inefficient men who, by reason of their shortcomings, should find no place in an organization which has charge of a resource of such great and general public value.

The fire hazards in different parts of the province vary greatly. In the dry-belt of the Interior, there exists the most serious menace to be found anywhere in Canada. The annual precipitation in this country varies from a minimum

SESSIONAL PAPER No. 310

of 8 inches to a maximum of 12 inches, depending on the locality and yearly variations in climate. Most of the precipitation falls in the form of snow during the winter months, so that during the summer; from early spring until September at least, there is, except for very brief intervals, a more or less continuous hazard. Timber stands in the dry-belt are lighter, and consequently wood values are not so concentrated as in other parts of the province. The forests of this region, however, serve the very important function of watershed protection, and on that account, if for no other reason, their protection and permanent maintenance is absolutely essential to the well-being of the community. Incidentally, it may be stated that the entire stand of western yellow pine, so far as this species is found in Canada, is confined to the dry-belt; while the quantities of this timber are limited, there are certain uses for which the wood is highly prized, and its careful protection is desirable. It is in the dry-belt country that very considerable ranching operations are carried on, and for this reason many people have reason to visit the upland country, thus increasing the fire hazard. Also, severe dry electric storms are experienced and many fires are started by lightning.

In the interior wet belt conditions are entirely different. Owing to more abundant precipitation, the average season does not present serious fire hazards, except in unusually dry years, and for more or less brief periods. Timber values, on the other hand, are very high, and the occurrence of fire emergencies from time to time absolutely demands continuous organization for fire protection. On the Coast also, owing to the very heavy precipitation experienced, it is rarely that any extended period of fire danger is experienced. The occurrence of very serious fires during the last few years, however, has clearly demonstrated that such emergencies can arise and continue for more or less extended periods. There are some parts of the Coast District where it can almost be stated that no material fire danger exists; in the Queen Charlotte Islands, for instance, the precipitation is so heavy and so general, that little trouble is experienced with fire. For all of the coast regions, the timber values are exceptionally high, and on this account careful precautions must be taken if great losses in timber through fires are to be forestalled. In the Coast District the fire hazard centres very largely around logging operations. Here and there, scattered up and down the coast, both on the island and on the mainland, there are numbers of operators engaged in taking out timber. To a great extent these operations are carried on by the use of donkey engines and logging railroads. Therefore, in addition to the hazard incidental to any logging operation through the presence of men, there is the added hazard due to the use of equipment, the power of which is developed through the use of fire.

In a province where climatic and timber conditions vary so greatly from place to place, the work of fire protection is naturally carried out under various methods. In some parts of the interior, where transportation facilities are poor, the staff must necessarily resort to the use of saddle and pack horses for transportation. Where roads are better automobiles and trucks are very extensively used; where water communication is good, gasoline boats provide the means of conveyance. In the Coast region particularly, the Forest Service operates quite a fleet of gasoline boats, both for carrying on fire protection activities and also for timber administration. Finally, the province has taken advantage of an air base established at Vancouver by the Royal Canadian Air Force, and to a limited extent use aircraft in fire protection operations, more particularly for moving "overhead" and portable fire-fighting units.

Notwithstanding the great advances made in forest protection in British Columbia during the past decade, it is apparent that further development is required. For a province that reaps such large revenue from its forests, it is all too evident that insufficient funds are used in its protection. The

money for fire protection is derived through the operation of a "forest protection fund," to which the licensees and owners of timber lands contribute at the rate of $2\frac{1}{2}$ cents per acre for the amount of land within their timber holdings. To this fund the government also contributes in the ratio of \$3 to every \$2 contributed by timber holders. From the total fund so established fire protection operations throughout the province are carried on, including the protection of all unalienated timber lands.

Basing conclusions upon the average expenditure for the past five years, it may be stated that the province spends approximately one-half million dollars in fire protection annually, nearly ten per cent of which has been in the provision of equipment, including motor boats, automobiles, fire-fighting pumps, tools and miscellaneous equipment required for the work. The balance of the expenditure has been divided about half-and-half between preventive and detection work, on the one hand, and fire-fighting operations, on the other. If there is, perhaps, one direction more than any other where we may point to a weakness, it is in the fact that, relatively speaking, exceedingly limited funds have been devoted to the provision of improvement facilities such as trails, lookouts, telephone lines, etc. In these directions advantage has been taken of the various public works already existing and of the numerous avenues of travel which have, during the history of the province, been provided. There is no doubt whatever, that the high timber values in British Columbia not only justify, but actually demand, the expenditure of much larger sums of money on capital account, in the provision of all those improvements which are so essential to the operation of a successful fire protection organization. This again leads to the question of dedication of forest areas; wherever action in this behalf is not taken, it is more frequently the case that, not enjoying full title or assurance to the land on which it is desired to provide such facilities, the forest service hesitates to expend any large amount of funds thereon, until such time as they may have assurance that the expenditures which might so be made will be of permanent value; indeed, in the premises, it is almost impossible to get funds for that purpose.

(f) THE DOMINION

The function of forest fire protection in the prairie provinces and in the Railway Belt of British Columbia is exercised by the federal forest service. As in other regions, the beginning of this forest protection work was in the provision of a widely scattered and loosely supervised fire-ranging staff. Although there existed during the early history of the organization, several forest reserves, none of these had been thoroughly organized on basis of fire protection administrative units. The serious fire situation which obtained in 1909 and 1910, the more liberal financial support which the service was able to secure, and the availability of a larger number of specially trained men made possible a complete reorganization of the field work in 1912. In that year a "district system" was effected, inspected offices being installed in each of the three prairie provinces and in the Railway Belt of British Columbia. Organization of the reserves was at once begun, and, regardless of what the other administrative necessities might be, the reserves were subdivided into administrative units based on the requirements of fire protection. Individual reserves are in charge of forest supervisors, who are provided with such technical assistance as the limits of personnel permit, and with a permanent ranger staff; these constitute the skeleton fire protection force, retained throughout the year. During the fire season this staff is supplemented by additional steady employees in the capacity of assistant rangers, and, largely by reason of development in organization generally, it has been possible to secure a certain amount of season to season stability, even in the men secured in this latter grade.

SESSIONAL PAPER No. 310

Along with this organization of personnel, there was inaugurated a definite system of improvements, consisting of roads, trails, buildings, lookouts, telephones, and miscellaneous other projects. After ten or twelve years' work, although there still remains much work to be done of this kind, there is, nevertheless, installed on these reserves a comprehensive layout of improvements. The forest rangers are to a greater extent properly housed under conditions which contribute to their contentment, so far as such isolated conditions will permit, and by transportation and communication facilities they have been linked up with the outer world, so that there is definite knowledge, at practically all times, as to what the conditions may be, and what work is being performed on the reserves. Thousands of miles of roads and trails, many hundred miles of telephone lines, hundreds of buildings, many lookouts, and other improvements of a permanent character have been installed. Just as the federal government has gone further in the establishment of permanent forest reserves, so have they gone further perhaps in the development of permanent improvements and in the provision of various facilities essential to modern fire protection, than have other organizations.

So much for the forest reserve areas; an entirely different situation exists outside of the forest reserves, on the vast areas of timber-lands designated as "Dominion Lands". Owing to the fact that the forest service exercises no administrative control over timber matters on such lands, it has been impossible to develop work which would justify the retention of a year-long staff. This results in the present condition, namely, that fire protection on these lands is carried out through the operation of a staff entirely seasonal in character. There is no necessity to repeat or enlarge upon the impossibility of developing a satisfactory fire protection organization by this means. The method is one which has been tried and has continuously failed in the attainment of even reasonable efficiency; it is one which at best may only be considered as an expedient until such time as true forest lands may be permanently dedicated to forest production, by the establishment of forest reserves, properly organized and equipped with personnel and facilities essential to a proper degree of forest protection.

Over such a large area there is naturally great variation in fire hazards. So far as British Columbia is concerned the conditions have been somewhat briefly reviewed in the previous section. The remarks made for the province generally, apply with equal force in the Dominion Railway Belt. In Manitoba the fire hazard is not inordinately great, but from time to time the province experiences periods of severe, if not very extreme drought, as a result of which serious fire emergencies may arise. Some parts of the province are relatively inaccessible, notably the territory to the east of Lake Winnipeg, and also the northern part of the province. In past years fires have wrought almost untold damage on such areas, and it is only recently that measures in any way approaching effectiveness have been applied. In Saskatchewan the average fire hazard is more pronounced than in the case of Manitoba, and emergencies occur at more frequent intervals. In Alberta the fire danger is even still greater, particularly in the mountains, where from year to year and from place to place emergencies of considerable intensity occur.

Over such an extended territory also, methods of control vary greatly. It may truly be said that every method of patrol adopted in any part of Canada may be found in application in one part of the West or another. Horses, dogs, canoes, motor boats, automobiles, railway speeders, aircraft,—in fact, almost any form of conveyance that may possibly be conceived, is used to some extent. Particularly in the use of aircraft for fire protection, the federal service has perhaps gone further than other organizations, by reason of its ability to secure

from other federal organizations the essentials to such operations. Two distinct classes of air operations are carried on. In Manitoba hydro-aircraft are used exclusively, and in addition to performing the function of detection, they are also used in a measure for fire control. In Alberta on the other hand, by the use of land aircraft a very considerable part of the Rocky Mountain Forest is patrolled; in this case, the operation serves more exclusively the function of fire detection, as the machines are not capable of transporting men or supplies and cannot, therefore, well be used in control operations, except for the transportation from place to place of "overhead."

It is hoped that a clear idea has been given of the fire protection problems in Canada, and that the steps now being taken to combat forest fires have been sufficiently explained. It has been frequently stated that there is an appalling lack of comprehension as to the seriousness of the fire situation, upon the part of the people and the governments, and as to the necessity of effecting radical improvement in control of the situation. It is characteristic of human beings that in their varied activities they are imbued with an ever-present necessity for self-protection. In cases where the higher and less selfish application of this trait manifests itself, the necessity lies in the possible need of those who may be dependent; it is a favourable development of civilization that man now has a tendency to look further into the future and to provide more or less adequately for the contingencies which may arise, not only for himself, but for others who he feels have a claim on him. Children are taught not only the laws of self-protection, but are also encouraged in greater or lesser degree to cultivate a regard for the future. These manifestations are witnessed not only in the individual, but also in communities, and even in nations there is evidenced the spirit of collective self-protection. Aside from the stupendous expenditures incurred during the late war, and in incidentals arising therefrom, we in Canada annually appropriate some 11 or 12 million dollars for limited preparedness against the possible attack of an invader. It is not argued that such expenditures are unnecessary; rather, it is merely pointed out that these expenditures are made purely in the exercise of this spirit of self-protection. Moreover, these expenditures are made in a direction in which, although the greater assurance of safety may fully justify them, there is nevertheless no direct monetary benefit either in the form of revenue or in any other direction.

Agriculture is an industry in which to a greater extent the practical operations can be, and in fact are, left almost entirely to private enterprise, State activities being more or less confined to the educational, experimental and research functions, and to the administration of various enactments,—all to the end that private enterprise in agriculture may work under the most advantageous conditions. Every act of the State to encourage agriculture is fully justified, for after all it is our leading industry. Here again, however, the returns to the State are indirect; comparatively little that could be designated as direct revenue is received by any government as a result of its interest and expenditure in agricultural activities. This fact notwithstanding, the federal government alone appropriates annually close upon six million dollars for agriculture and allied pursuits.

After these digressions for the purpose of comparison, we may again consider the vital part which the forest has played in the industrial development of Canada, and the important part it must continue to play, unless we are going to allow industries of great magnitude to go into decadence. From this source, some six governments in Canada derive in the aggregate a very extensive direct revenue, although, as has already been pointed out, in the extraction of these revenues they have been trading rather seriously on our capital stock. In various localities, we in greater or lesser degree seem to exhibit some evidence that we comprehend the fact that our forest reserves are continuously menaced

SESSIONAL PAPER No. 310

by fire; but, even doing so, do we take sufficient steps to offset or adequately ameliorate the severity of the attacks? As against the eleven or twelve million dollars appropriated annually for preparedness against attack from a *possible* invader, just how much money do we expend, or how much energy do we devote, in meeting an *actual* enemy, that is constantly reducing the value of our estate? In stumpage values and in extraordinary fire fighting, our direct annual fire bill is fifteen million dollars; our actual loss, in products, in wages, and in other directions, many times that amount; what do we provide to reduce this annual toll imposed by fire? As against possibly seven or eight million dollars expended by various governments in Canada for the encouragement of agriculture, from which they receive little or no direct revenue, just how much do the same governments spend in the protection and development of the forest resources, which in several provinces at least is the financial mainstay?

Taking the aggregate of amounts expended by the government organizations that exercise the function of forest fire protection, there is expended on forest fire protection in Canada, by such organizations, somewhat less than two and one-half million dollars. On the other hand, the total of direct forest revenues closely approximates twelve million dollars, this including only stumpage and other miscellaneous charges incidental to the sale of standing timber. In Part I of the report it was shown that the total value of primary forest products, exclusive of lumber, pulp, shingles and lath, is approximately 170 million dollars. With such facts as these before us, can it be said that two and one-half million dollars is ample provision toward continuance of the forest resource and forest industry, when experience has abundantly shown that we have not yet conquered the fire hazard?

In those forest areas where fire protection facilities are provided in greater degree, namely, on the forest reserves in western Canada, the expenditure for fire protection is less than $2\frac{1}{4}$ cents per acre. In some districts where timber values are very high, larger expenditures per acre are undoubtedly made, but over broad tracts, from 2 to $2\frac{1}{2}$ cents is the best provision which has been made. Can it for a moment be said that we are applying to our forests anything more than a pittance in protection—the only insurance they get? Such treatment of the forest resource attains precisely the same result as does the purchase of cheap and unreliable insurance in every-day life; namely, we are unable to collect that for which we insure. Indeed the forest resources under present provisions so seriously lack protection, that it is well-nigh impossible for a timber-holder to make any reasonable arrangements for commercial insurance upon his timber property, for there are no companies that can assume the risk at rates which can be met. In a town or city where great fire hazards are allowed to accumulate, and where insufficient organization for fire control is provided, underwriters must necessarily impose what would appear to be exorbitant rates for insurance; these it may be impossible for the community to sustain, and if the town burns there is a dead loss. This is precisely the condition which applies on our timber areas. It is the condition which retards not only the development of proper methods of forest management, but also very largely retards the influx of capital so necessary to development. Moreover, by reason of the large losses sustained, we must go farther afield for wood supplies, and there results a continual rising in cost of raw materials to the industries already established.

Truly, the reasoning which we apply to our forest business is seriously deficient in business principles, and this is not due to an absence of those who can point the way; rather is it the result of that peculiar form of psychology that is born of riches—a lack of appreciation of the value of resources until they are on the ebb. As evidence of rather inconsistent reasoning applied to two natural resources, it may be stated that in some districts where game

control measures are rather effectively developed, if some one should shoot a moose or deer out of season, and for that offence be prosecuted and subjected to such penalty as law may provide, the officer responsible for the conviction usually has the sympathy and support of the local population. Just why is this? It is because the enforcement of laws which are aimed at the conservation of game animals appeals strongly to the sporting instincts of human nature. Compare to this the more frequent occurrences in connection with fire trespass cases; not only many of the people, but even judicial officers, more frequently those in rural communities, are disposed to underestimate the seriousness of fire offences; very often offenders are permitted to get away with penalties in no way commensurate with the offences committed. The destruction of considerable areas of forest entails much greater damage and disadvantage to all people in a community, but, simply because a fire case is one which does not perhaps appeal to their sporting instincts, the true significance is not attached to it. Assuredly, it is almost past understanding that, in a question which affects so profoundly the welfare of the people, the latter do not attach more importance to it.

Exemplifying another phase of the reasoning applied by the public to the fire problem; it is now thoroughly recognized that as a measure of fire control, it is essential that all travel within the forest, during the danger period, should be controlled. This object is most frequently attained through the enforcement of travelling or camping permit laws. The one thing which is fundamental to the success of such a permit law is that the officer who issues the permit should bear the responsibility for the enforcement of the permit conditions. The only part of Canada where a permit law of this character has been successfully worked out, is in the province of British Columbia, where a forest ranger is responsible, not only for the issuance of permits, but also for controlling the fire situation which may arise through the exercising of this function. Elsewhere in Canada, where permit laws have been established, there has been failure to appreciate this fundamental requirement. In other words, having come to the conclusion that a permit law is essential to fire protection, there is a decided tendency to evade the only means by which such a law can be enforced and made to produce the results required. Resort is more often taken to the use of other public officials, possibly municipal officers, justices of the peace and so on, and the process of issuing permits is simply gone through as a matter of routine, no responsibility attaching to many of those issuing them. After all, if there is necessity for a permit law, there is just as much necessity for establishing the machinery essential to its proper enforcement; if this be not done, the law itself must inevitably fail of its purpose. It is due to the absence of adequate provision for enforcement, that critical fingers are pointed at a law of this character, and false claims made that it can accomplish nothing.

These, and hundreds of other examples which might readily be cited, clearly point to the necessity of adopting methods that will, in addition to educating the people by appeal to their reason, compel observance on the part of those who cannot be so convinced of the necessity of protecting the forest resources. By every known expedient of law and of persuasion, we have simply got to bring about a change of attitude on the part of the public toward the subject of forest conservation.

CHAPTER IX—TIMBER ADMINISTRATION

It having been decided by a government that forest lands are to be permanently used for timber production; having provided legislation and having created the responsible authority to lay down and carry out that policy; having subjected lands to a classification upon the basis of which they are segregated into two classes; having dedicated forest lands to the purpose for which they

SESSIONAL PAPER No. 310

are intended; finally, having provided for the survey of the timber resources, and for their protection;— it is then necessary to give consideration to some of the outstanding principles which should be observed in the treatment of timber lands.

Before dealing with the permanent forest areas it should first be pointed out that classification will show many instances in which agricultural lands bear stands of timber of greater or lesser value. To lands of this character it is necessary to accord special consideration.

AGRICULTURAL LANDS BEARING TIMBER

Notwithstanding the fact that, as a general proposition, all agricultural land should be permanently assigned to that use, it is obvious that considerable economic loss would be sustained if a valuable stand of timber were allowed during the process of settlement to be simply destroyed, without putting it to some form of use. Before the land is actually turned over to settlement, every effort should be made to bring to one form of utilization or another valuable timber standing thereon. It may on occasion be advisable to use the settler himself as the instrument in bringing about utilization, for frequently by such means the timber may be made to offset the subsequent heavy labour cost in land-clearing operations. From the standpoint of conservation, however, the only restriction which must be observed is that valuable timber is neither intentionally nor accidentally wasted. In view of the purpose for which the land is ultimately to be used, there is clearly no necessity for imposing any conditions which look toward the retention of any part of the stand; the effort should be to get it entirely removed just as quickly and completely as possible.

So much for mature timber on agricultural lands. There is a second degree of the same problem, namely, in the existence of many near-mature stands which, although not immediately suitable for utilization, will in the course of a few years reach the state of merchantability. Here again, considerable economic loss would entail, if the settlers were permitted to destroy the forest. Where absolutely no market now exists for the immature timber, and where there is distinct possibility of such a market developing by the time the timber approaches maturity, naturally it should be preserved, as here again, it may be made to offset in considerable measure the cost of clearing operations.

As applying to both the foregoing cases, it may be stated that operations for pulpwood provide an excellent opportunity for the disposal of timber in sizes which would be deemed entirely unmerchantable in almost any other form of forest utilization. For either case, therefore, and on the primary assumption that the land is agricultural, the principle of sound economics is faithfully served, and can only be satisfied, in the immediate utilization of the timber.

In attributing great economic value to merchantable or near-merchantable timber on agricultural lands, it is perhaps well to emphasize that, on areas where the timber stand is heavy, the process of land-clearing is in itself a very laborious and expensive one. For this reason it has frequently occurred that the clearing of such lands, under restrictions which do not permit of actual sale of part or all of the timber, imposes upon the land, when eventually cleared, capital charges that may actually place it beyond the point where it can yield a proper interest return even under intensive agricultural use. While the economic waste involved is perhaps not so glaring in the case where clearing charges consist in labour given by the settler who may remain on the land (there must, after all, be some value attributed to the farm, as a home for him and his descendants), if such labour must in the first place be paid for in cash, it is readily perceived how serious the burden may be. There is surely a great

degree of logic in the position that where timber, which has a value as such, offers obstructions to the use of land for the purpose to which it is best suited, the timber value itself may justifiably be applied against the operations of clearing. As a project capable of financial success, how much more simple it is to attack a piece of timbered agricultural land, upon which the timber values may be made to offset clearing costs, than it is to go in upon an area where all timber of value has been removed—or else is subject to removal for the benefit of others—leaving to the one that must undertake the clearing a multiplicity of stumps, with little else but hard work to apply to the clearing.

It is by no means argued that under the beneficent clauses of a homestead act, settlers should be given title to valuable tracts of timber,—far better than that, would be the practice of disposing of timbered agricultural land by sale outright to the highest bidder, and leaving it to private enterprise to utilize the timber, and subsequently make the land available for agriculture: rather, the argument is that the methods under which timber is disposed of on agricultural Crown lands do not take into consideration the character of the land itself, or, if they presume to do so, the method is most assuredly not an efficacious one, and large amounts of agricultural land are permitted to be withheld from their proper use by persons speculating upon a general rise in timber values. In addition to preventing legitimate agricultural development, such methods throw out of economic balance the value of true forest lands, and by that means retard proper development in forestry.

Truly, if there be any market at all for timber on agricultural lands, there is just as great economic waste in retaining it, as there is in the retention indefinitely of over-mature timber on true forest land.

The third phase of the problem is the case where agricultural land bears young growth of some valuable species, for which there is no present value, and for which there will not develop a value for many years. Under conditions obtaining in this country, there is no economic justification for the preservation of such stands; if they are susceptible of removal, the proper treatment is to permit of the lands being cleared and made available to settlement at the earliest possible moment. After all, it must be remembered that these very young stands did not cost anything in their establishment; it is usually the case that the sum-total of the value of agricultural crops which could be raised in the same time which maturing of the timber would require, would far exceed the monetary value of the timber at maturity, if the latter were to be retained. While in some respects this position may be opposed to the views of some conservationists, and while, from a sentimental standpoint it most certainly is disappointing to anyone having an interest in trees to see healthy young growth of timber removed, the matter must, after all, be considered in its economic aspects, and full recognition must be given to the fact that, if in agriculture lies the economic use of any particular tract, every step even involving the destruction of a considerable amount of timber reproduction, should be taken to make it available for agricultural development.

Once more, it may be stated that, if the foregoing conceptions are given the approval which in sound economics they unquestionably merit, there will be almost entirely removed from the public mind the present unfortunate and unwarranted basis for the belief that there exists an inherent factor of conflict between agriculture and forestry.

A practical demonstration of the theories outlined above, and of the economic loss involved in failure to make available for agriculture lands which are primarily suited therefor, lies in the case of some timber berths, the licenses to which are renewable from year to year, presumably for almost indefinite periods of time. Such licenses almost invariably provide for diameter limits below which no timber is allowed to be removed, and there are frequently other

SESSIONAL PAPER No. 310

provisions designed primarily to serve cases where timber is presumed to be in occupation of non-agricultural lands. More frequently occurs a blind adherence to such conditions, notwithstanding the fact that by so doing, agricultural land is withheld from its proper use. It should hardly be necessary to emphasize that this blind adherence to the application of routine administration is creative of just as many serious mistakes, and gives rise to as many misconceptions, as does the impractical or unintelligent adherence to established routine in any other activity whose many variables of condition or degree may require the injection of important exceptions.

As exemplifying the importance of bringing timbered agricultural lands to their proper use, let us consider, for a moment, the effect of the negative policy upon the all-important and very irritating question of taxation. As land has greater value in agriculture—if it be capable of that use—than it has in timber production, it may under the former use be subjected to more severe assessment for taxation. True forest land, on the other hand, being useful for one purpose only—and that, a less productive one—cannot stand taxation to nearly the same extent. In the premises, every tract of agricultural land withheld from cultivation in a community either limits the community activities which may be carried on, or else increases the taxation which must be applied to agricultural lands used as such. Similarly, owing to the constant demand for improvements in any community under development, true timber lands are by such means called upon to pay a higher rate than is their due.

To the general policy of confining timber production to non-agricultural lands, there are, of course, some exceptions. In some cases, although not often, in the protection of watersheds or catchment basins, it may be necessary to retain under forest cover areas which might otherwise be advantageously used in agriculture. With this phase of forestry, however, the Commission would be wandering too far afield from its true purpose, were it to engage in extended discussion. Therefore, beyond recording the fact that, where such requirements do apply, the timber produced on such areas may also be made to serve the purpose of furnishing timber supplies, the question may well be left to treatment by more scientific bodies.

Similarly, where conditions other than the necessity of providing timber supplies render it desirable that limited amounts of agricultural land should be kept in forest, whether for the purpose of shelter, for aesthetic reasons, or to provide recreational facilities—such cases may well be left to special consideration, as they do not materially affect the questions under review by this Commission.

THE MANAGEMENT OF TRUE FOREST LANDS

We now pass to a discussion of the greater problem, namely, the administration of timber on true forest lands, which it is presumed have been, or will be dedicated to forest production in the form of statutory reservations.

The retention of timber beyond the stage of maturity, even upon true forest lands, involves economic waste. Although timber may continue to live for scores or even hundreds of years after it has reached financial maturity, the limited growth which the individual tree puts on is entirely offset, if not actually more than counteracted, by losses throughout the stand by the general decadence therein. Therefore, except insofar as the systematizing of a plan of consistent annual use of timber (in order that these annual supplies may be properly distributed over the required term of years, until they are replaced by younger timber coming on) may require its retention temporarily, timber which has reached maturity should be cut. Entirely aside from the decadence due to natural conditions, it is beset with so many hazards that the only proper treatment is that it should be put to conservative use at the first opportunity.

In the conception that forest conservation involves the retention beyond maturity, for future use, of timber which is now marketable, there is just as fundamental an error, albeit a less dangerous one, as there is in neglecting to adequately protect the seedling growth, the saplings, the adolescent trees, and the near-mature timber, which obviously should constitute the future timber supplies.

To permit of consistent treatment of the subject, and in order that it may properly synchronize with the fundamental principles outlined in the previous pages, it is essential that in dealing further with this phase of the problem, we should consider timber as a crop. Unless this fundamental conception be applied to the timber resources, we must inevitably continue to conceive of the forest as a mine. Adopting the principle, it is now proposed to deal with various phases of the subject.

1. REGENERATION

While it is manifestly beyond the scope of the Commission to discuss in detail the technicalities of forest regeneration, there are some fundamental points which may well be considered. Recognizing, on the one hand, that under conditions of proper management and protection, timber has the power of reproducing itself naturally, recognizing, on the other hand, that starting with bare land, and with a quantity of seed, it is possible to secure seedling growth which in the course of years may be built up into a stand of timber;—it is desirable to consider which of these two very different methods may have the greater and more economical application in Canada. On the one hand, it requires no great degree of imagination or study to reach the conclusion that, for very broad areas in this country, there exists an excellent opportunity for carrying on timber production, without resort to the use of artificial methods such as seedling and planting; on the other hand, for areas where the soil has been entirely divested of tree growth, or even on areas which have been entirely divested of merchantable species, if any reproduction of the more desirable kinds of timber is to be secured, it can only be done by artificial means.

Considering for a moment the relative cost of the two methods, and using by way of illustration only the most general figures, it may be stated that the planting up of forest areas with seedlings or transplants grown in a nursery may cost anywhere from ten to twenty dollars per acre,—even more, if heavy transportation costs have to be met. Notwithstanding its high cost, the very fact that under this method, some definite and complete piece of work is being undertaken, the yearly results of which are clearly perceivable to the public as time goes on, artificial regeneration is one which appeals strongly to the imagination of the people in this country. More frequently, for the person who has got beyond the belief that forestry consists solely of fire protection, his conception of forestry is that of extensive planting and growing of timber. While it is by no means argued that there are not extensive areas where such planting operations are both necessary and readily justified, it should be strongly emphasized that the conception that forestry consists essentially in tree planting, is one which operates to restrict the general application of the true principles of forest conservation.

Let us for the moment call to mind that probably nowhere in Canada are amounts greater than three or four cents per acre being expended in fire protection work. Without further elucidation, it will surely be abundantly clear that the application of funds at the rate of from ten to twenty dollars per acre, for artificial regeneration, would over relatively small areas entirely exhaust the gross appropriation of public funds for forestry purposes, leaving nothing for the protection and administration of timber resources made available by nature.

SESSIONAL PAPER No. 310

and that such treatment would result in the utter neglect of valuable resources now existing. It is true that in some European countries, as a result of intensive utilization of timber in years gone by, there was necessity for the adoption of artificial methods of regeneration. In Great Britain it was only by such means that the forest could be re-established. Perhaps, rather surprising to some people who may lean strongly toward this conception of forestry, will be the statement that, even in Europe, the present trend of forestry development is back toward the systems of natural regeneration. It has been found that, although it has been possible to plant and grow timber more rapidly and more consistently by artificial means, the method has, nevertheless some inherent disadvantages entirely aside from cost, which have caused forest authorities to give serious consideration to returning to methods more closely resembling those used by nature.

Just as a market gardener may, by the use of hot-beds and cold-frames, produce vegetables in shorter time than is possible under entirely natural conditions, so may we in growing timber adopt the quicker and perhaps more certain methods of artificial regeneration; in both cases, however, the results are accomplished at greatly increased cost. Furthermore, as the gardener can find a market for the produce so derived because it becomes available at a special time, so may timber grown from nursery stock be profitably marketed if it happens to be so located that, by reason of low transportation costs, it is as cheap as, or cheaper than, wood grown in natural stands.

✓ Let us therefore get a clear conception of the problem. Regeneration by artificial methods is relatively very costly, and should only be adopted where the production of the species required cannot be satisfactorily secured by natural means. The high cost of artificial regeneration is the price we must pay for past carelessness in treatment of natural forest, and in some areas we must submit to these higher costs, if we are to have anything else than weeds and waste. Having re-established the forest by that means, however, our future methods of forest regulation should aim once more at natural regeneration.

For the purpose of illustration, let it be assumed that one hundred acres of waste land are planted with spruce seedlings at a cost, say, of \$15 per acre; the immediate total outlay therefor being \$1,500, aside from the cost of the land. In 50 years we may have a stand 30 cords to the acre, or 3,000 cords in all. By that time the original cost of replanting will at 4 per cent have accumulated to \$10,660, to which amount must be added the accumulated value of expenditures made in the interval. Let us suppose that, apart from the cost of protection, incidental expenditures have been compensated by the value of material secured from any thinnings which have been made. Again, let us suppose that protection of the area has cost us at the rate of 10 cents per acre per year—stands which entail large investment in the beginning must be adequately protected; at the time of cutting, therefore, our accumulated protection charges have at the same rate of interest reached \$1,526. The total cost of the stand of spruce 50 years hence is \$12,186. Therefore, each of the 3,000 cords of wood harvested must carry a production cost of \$4.06, aside from any rental value on the land itself, and also on the assumption that thinnings have carried other costs.

Compare the foregoing to expenditures actually made in the care of natural woods. At best we may spend perhaps 4 cents per acre in protection (and that, over very limited areas only) and practically nothing in management, other than charges directly attributable to the phase of utilization. Starting with a stand naturally reproduced, we might have twenty or twenty-five cords per acre in the 50 years, and our accumulated protection costs on 100 acres would be \$610, or, taking the twenty cord stand, 30.5 cents per cord.

✓ It may well be asked, therefore, how our industries could possibly withstand the costs of artificial regeneration? The answer is simply this: by careless

treatment and lack of protection the industries are rapidly being driven farther afield for wood supplies. It does not require any great railway mileage to absorb in freight charges a sum greater than \$4.00 per cord; when it is remembered that even now logs are, in many instances, driven by stream over distances that require two years to bring them to the mill, it will readily be seen how easily the charge may be absorbed. In the foregoing illustration we have set aside the charges on land; we have also adopted a relatively low rate of interest; it must not be hastily assumed, therefore, that wood can, by artificial methods, be produced at the cost mentioned. Rather, the proper conclusion to be drawn is, that in the dissipation of timber resources in close proximity to forest industries we are rapidly bringing our timber lands to that state where it will be necessary to replant them with desirable species, and the raw materials must then carry a heavy production charge. Heretofore, in talking of "production cost" of timber, it has been our custom to include, not the cost of growing, but only the cost of the physical operation of harvesting, the cost of a tithe in protection perhaps, and the cost of transportation; and by this shiftless business calculation, we have left unproductive areas close at hand which, accorded proper treatment, would have produced in continuity.

Although forest protection alone cannot in all cases bring about the proper natural regeneration of desirable species, it is a factor of outstanding importance in determining whether or not we shall saddle ourselves with the added cost of artificial methods. In allowing our present losses to continue, we are doing nothing more than gambling as between two, three or four cents (frequently, a fraction of a cent) per acre toward fire protection, and *real* fire protection, in a situation that without real protection must ultimately and inevitably impose production costs of four, five or six dollars per cord on our raw materials; we are gambling the pittance, and, as frequently happens with the "long shots", we are rapidly and consistently losing. When experience elsewhere dictates that even if we do have to resort to artificial planting to restore our neglected timber lands, we shall probably in any case come back again to natural regeneration, wherein lies the logic of proceeding fullsteam ahead to heavy production costs? We have had our "fling"; let us gather up the remnants and apply methods more characterized by sanity and providence.

In Part I, Chapter II, Section 10, in discussing the custom of calculating our resources in "so-many-years' supply" an analogy was drawn between this practice and the principle of annuities. When we cast our eyes over the extent of timberland in Canada which can be made and maintained permanently productive, we are a faithless and supine people indeed, if we tremble before the responsibility, and rest content to count the years. More than that, even in such selfish and short-sighted calculations, we neglect even to provide that outstanding characteristic of the annuity system, namely, security from reduction, except through withdrawal of the annuity itself.

Although, therefore, as a result of past neglect, whether it be through extreme cutting or through lack of protection to remaining stands, there are many areas where artificial methods must be resorted to if a usable stand of timber is to be produced, it is senseless to talk of doing that, if we cannot at the same time devote far more than the one-five hundredth part to the protection of timber already standing. The turning away of our eyes, and of our endeavours, from the extensive provisions of nature, and the adoption of artificial methods upon a large scale, savours of the heroics of the small boy who turns from a good home and three square meals a day, to a temporary life in the brambles with rabbits for his daily fare, simply because it seems courageous to hunt rabbits and be independent.

By all means let us re-establish the forest upon areas close to the wood markets, where natural regeneration is impossible; but, by all means, let us depend upon the cheaper, saner methods of natural regeneration wherever that

SESSIONAL PAPER No. 310

method can be pursued; and in order that the latter method may afford the results of which it is capable, let us more adequately protect the forest. If our efforts at protection were increased four-fold, it would only impose upon the wood at the time of cutting an additional cost of somewhere from fifty cents to one dollar per cord. Of one thing we may rest assured; if we do not afford more adequate protection, and even without the application of artificial methods, the cost of our wood will increase far more than the cost of protection, due to the added expense of bringing the timber for longer distances; indeed, we have seen it do so several times over within recent years.

2. INTERMEDIATE TREATMENT

The handling of timber between the time of regeneration and that of utilization involves many problems of a technical nature, with which the Commission is manifestly not in a position to deal. The occasion is seized upon, however, to reiterate one important point, and to introduce another: (a) it is this period through which the timber must be absolutely protected against interference of any kind—the area must be reserved against other destructive use and against tampering and it must be protected from fire; (b) whereas, in Europe and some other parts of the world, there is a market for small material taken from the forest in the operations of thinning, and the value of such intermediate products is such as to more than pay for the operation,—in this country, it is only in the most isolated cases that this applies; the artificial planting of timber demands timely thinnings, if optimum results are to be secured, and as this cannot here be done at a profit, thinnings impose an added cost, rather than being revenue-producing.

3. UTILIZATION

The purposes of forest production vary greatly. A forest area may be administered exclusively for the continual production of timber; on the other hand, it may be required solely for the purpose of watershed protection; or it may serve both objects. Even in the most extreme cases of watershed-protection-forests, however, it is more frequently possible, and decidedly in the interest of economy, that mature timber should be utilized, in order that waste may be prevented, and the cost of watershed-protection by this means reduced. In a country where forest areas are extensive, notwithstanding the fact that the quality of timber may be relatively poor, there is a tendency toward tying-up in various forms of protection areas, valuable assets in mature timber. Although naturally, if the area is to serve its purpose, it must be subjected to special treatment, there are times and cases where great economic losses are entailed in absolutely preventing the removal of timber.

On the principle that a forest is to be handled for sustained yield, the stage of forest utilization theoretically does, and practically should, involve the removal from the forest in annual or periodical instalments of an amount approximately equal to the gross increment in the forest for that year or period. Needless to say, it is physically impossible to take from the forest the actual identical wood which is produced in the year or period; rather, the wood available and which should be used, is that amount of mature timber which is equal in volume to the increment in the entire forest for the particular period.

Maturity in timber is relative, and depends on many factors; in no case is maturity the maximum size or age which a tree is capable of attaining. Maturity is that stage at which timber reaches the point where, although it may increase in size and volume, it does so at a rate slower than will make it financially profitable to retain. As between different uses for which timber is grown, there is variation in the time of maturity; for lumber, shingles, etc., large clear

logs are required; for pulpwood, much smaller trees will suffice. Finally, size of the individual tree is no indication of financial maturity,—a tree twenty inches in diameter may still be growing at a rate which justifies its retention; on the other hand, a tree ten inches in diameter may be suppressed and over-mature. Over a given forest area of considerable size, if utilization is carried on in one part of it to such an extent that, merely by reason of accessibility—and consequently, reduced cost in logging—trees are taken which have not reached financial maturity, whereas in other parts of the stand mature or over-mature trees are left uncut simply because they are more difficult to get at,—there is lack of economy, in that the quality of young stands is impaired, while areas of over-mature timber are left unproductive.

If the forest is to be maintained in a continuously productive state, there are four main points which must be kept in mind during the stage of utilization:—

- (a) That the natural regeneration of desirable species is required;
- (b) That the forest has to be protected until the next crop is matured;
- (c) That over a forest unit there must not be removed in one year a greater volume of wood than the forest can grow in one year;
- (d) That the operation must be productive of financial profit.

With these pre-requisites in view, let us examine closely the methods actually pursued in Canada. First of all, there are many who will say at the outset; that if (d) is to be attained, (a), (b) and (c) must one or all be relegated to the background, as they are “entirely impracticable”, “purely theoretical”, and that profits cannot be earned if they be applied. Taking the latter statement at its value, we may at once conclude: if (d) cannot be carried out in such a manner that the other three are observed, *then* the forest cannot be maintained in a continuously productive state; the forest areas must continue to decline in extent and quality; the industries must find some other raw material; or, as is more frequently stated, “we will plant new forests”!

It is entirely owing to the fact that, deluded by supposed “illimitable supplies” we have simply refused to recognize the axioms of the problem, and having developed our forest industry on that unsound basis, we find it difficult to now bring ourselves to take the action required. We assume that it would entirely upset our forest industry, and that it would rob us of our markets, as the requisites could only be applied at increased cost of forest products; in such an assumption, however, we not only presume, but actually condone, the ultimate degeneration of the forest, of forest industries, and of thriving communities; either that, or we simply refuse to look ahead, we refuse to be influenced by any motive other than immediate and temporary gain, and in so doing, we trade upon the capital, soil and timber, thus robbing nature of the power to produce and contribute continuously to the welfare of the state.

(a) REPRODUCTION OF DESIRABLE SPECIES

The securing of suitable reproduction is one of the most important branches of silviculture; by natural methods it can only be economically done by control of the methods of utilization. So far as the commercial utilization of timber is concerned, there is only one part of Canada where there is definite and material control over logging operations, along lines which will permit of desirable reproduction, namely, on the forest reserves in Western Canada. Elsewhere, from Atlantic to Pacific, while the methods applied may have some restricting features theoretically aimed at suitable reproduction, they are measures the utility of which have long since been exploded, not only in other countries, but here in Canada where they have failed of the purpose for which they were designed.

SESSIONAL PAPER No. 310

Although the adoption of "diameter limits" in this country was originally designed to assure a proportion of the stand being left for future use, the practice was later re-vamped as a method of securing regeneration—it being assumed that if all trees below a certain size were left in the forest, ample provision was thereby made for reproduction. While it must be admitted that at least one reason for which it has failed of that purpose is because the logging slash was also left, and frequently the entire area was destroyed by fire, there are other cogent reasons. In the first place, in operating virgin timber, or even in second or third cuttings over the same area, the leaving of all trees below a certain diameter—ten or twelve inches, as the case may be—does not ensure that the number of trees so left will act as seed trees. As previously pointed out a ten-inch tree may be over-mature, and certainly under the conditions assumed it is generally a suppressed one,—and this, the tree that is left to regenerate its kind. It may be one in five, or only one in ten of such trees that may bear a crop of vigorous seed, but the others nevertheless remain indigent, contributing nothing, but on the other hand, consuming soil food, moisture, and light, all of which are essential to the new crop.

Very frequently the requirement to leave all trees below a specified size entails the retention of a greater number of trees than are taken out. There are certainly selection systems which are successfully used in countries where rational forestry is practised, but none that are successful approach in crudity this hit-and-miss policy of dictating in legal phraseology the size of the trees which must be left. If trees are to be left for reproductive purposes, they must be those that are qualified to serve that purpose, not the old suppressed weaklings that are themselves beyond recovery, to say nothing of their being incapable of giving birth to a thrifty new crop. Entirely aside from inability of suppressed trees to successfully function in the latter direction, they are all too frequently subject to windthrow as soon as the stand is opened up. Particularly on areas where a ten-inch diameter limit has been enforced, an inspection of the logged-over lands, a year or two following the operations will frequently reveal a veritable jungle of slash, fallen trees and debris. Under such methods it is futile to even talk of satisfactory reproduction of the stand, let alone the entertaining of hopeful expectations of securing it. Moreover, many an operator would willingly have sacrificed a healthy, vigorous tree of large size, and better able to withstand the shock of opening up in the stand, if in exchange therefor he might have secured several of smaller size, which by the application of routine methods, he is prevented from taking. That these smaller trees are susceptible of commercial exploitation in many districts is all too clearly exemplified in the frequent seizures made over areas where trees "under-size" have been cut; also, on some areas where some operators have been ingenious enough to take improper advantage of exceptions made where skidding roads are required, the mileage of skidding roads, and the number of seven, eight or nine-inch stumps, passes understanding!

If a selection system is required for any area, application of the diameter limit will unquestionably ensure the retention of a certain volume of timber, but beyond that, its utility has in innumerable cases been disproved. Examination of woodlands in almost any part of Canada, will furnish abundant proof of this statement; in fact, the diameter limit system seems to have the virtue, or the failing, of permitting the reproduction of several species other than those actually desired. Why then are other methods not applied, except, as previously stated, on the forest reserves in Western Canada; simply because the designation of trees to be removed, other than by written word in a contract, involves the physical operation of selecting the trees. To avoid the latter, and to confine inspection to the time after which the cutting takes place—i.e., after any damage has been done—there are written in the license, specifications which can by that means only be defined by the size of timber to be removed. In other words, to

save money in the cost of timber administration, we enforce a system which does not even accomplish the purpose for which it was intended.

The time of utilization is the most critical in the life of the forest. By what is then done, and how it is done, there is assuredly determined the probable future or character of the forest. Unless we are willing to devote something, even to sacrifice something, at that stage, we cannot hope to maintain the forest in a state which will permit or induce regeneration of the species desired. The presence or absence of logging slash also has a marked effect upon reproduction. There are many who argue that leaving the slash is actually beneficial to the young growth, in that it provides shelter to the seedlings. While the number and varied character of the reasons advanced for the leaving of slash in the woods are myriad, this particular one apparently entirely ignores the fact that perfectly healthy stands of almost any kind of tree may be grown on a bare field, devoid of timber for generations, without applying thereto a layer of slash, notwithstanding the fact that conditions for development of the seedlings in such a field may not be so favourable as in the properly regulated forest. If, however, in such circumstances, it were argued that a layer of slash must be provided, we would then find many to question the advisability of such action, owing to the cost of such treatment.

As a matter of fact, in the foregoing obverse application of the slash problem, we arrive at the real reason underlying the many objections to the enforcement of slash disposal provisions—namely, the cost. While there may possibly be species of trees whose seedlings might thrive the better for some protection, the leaving of slash can in no measure be advanced as a necessity; indeed its disadvantages so far outweigh the benefits which might be derived, that were we to adopt it as an *essential* feature in forest regeneration, we would simply fly in the face of experience gained throughout the world.

(b) PROTECTION

So far as fire is concerned, the hazards attendant upon the accumulation of slash in the woods have been somewhat extensively dealt with in the preceding chapter. Before passing to a brief discussion of the economics of slash disposal, reference may first be made to the influence of slash upon forest insects.

There is practically no case in which the leaving of refuse incidental to any use of land does not result in a deterioration of the areas so mistreated. In the case of woods' slash, the debris constitutes the breeding place of insect and plant parasites which contribute largely to a general weakening in the vitality of the timber stand. There are those who, being opposed to slash disposal, have the temerity to argue that the leaving of slash provides the insects with food, and, by so satisfying their remarkable appetites, their attacks upon growing timber are thus ameliorated: it were just as logical to argue that the leaving of corn husks and stalks in the cornfield by providing a food which will appease the attitude of rodents, would afford protection to the growing crop against the attacks of these destructive mammals; the prodigious breeding capacities of forest insects, and of rodents, are in the reckoning entirely overlooked.

The number and kind of forest insects is legion; some attack only dead wood; others confine their attention to the living trees; still others may be partial to both. It must, after all, be remembered that what we know as "life" in a tree is confined to the tissue between the bark and the wood and to the leaves and buds; in the solid wood of trees, life has ceased. For these reasons, there is an overlapping in the attentions displayed by insects and fungi, as between living and dead timber. It is of interest to note here that, in the comparatively recent epidemic of the bark-beetle, which attacked western yellow pine, the only

SESSIONAL PAPER No. 310

practicable method of control which could be developed was in the utilization of timber infested by the insects, and the complete destruction of all slash and debris incidental to the operation. With this particular species of timber, control measures were relatively more simple, owing to the restricted distribution of the tree. Nevertheless, it was only by complete removal of both the merchantable material and slash that control could be effected.

Coming now to the economics of slash disposal as a fire protection measure, we must in the first place, admit the hazard: that, surely, is self-evident, and being so, it is highly desirable, in fact absolutely essential, that slash disposal requirements should be enforced if it is economically feasible to do so. Let us first of all examine the basis for the arguments that it cannot economically be done; with very few exceptions those who adopt this position have never tried it,—such men can tell us all about how much they think it will cost, but never having tried it, they have no more justification for the utterance of positive statements on the subject than they would have in dictating the cost of some other operation in which they are entirely inexperienced. However, a few spasmodic experiments have been tried by operators, from which unfavourable results are claimed to have been obtained. There is, however, a certain amount of psychology to the slash disposal problem. There is probably no form of activity in which a greater amount of efficiency can be wasted, if the performer is so disposed, than in brush-disposal. If, therefore, an experiment is undertaken, the mental attitude of the performer will have a very great deal to do with the results to be obtained. If he be one who, simply because he does not want to have to do it, simply will not believe that it can be done, there is slight prospect of our getting cost figures that will show the practice is feasible.

There is something inherently disagreeable and unattractive about the work of slash-disposal; lumber-jacks do not like it, and logging foremen whose jobs depend upon "low-production costs" dislike the very thought of it. Nevertheless, entirely aside from the mental attitude of the operator himself, these are the men through whom experiments are invariably performed. The foreman to whom may be assigned the conduct of an experiment, is not relieved of his other responsibilities for low-production costs; he is simply told to try the thing and see what the cost may be. In the first place, the assignment of his best or average men to the job will increase his other costs, so he studiously avoids that; rather, he more frequently assigns the poorer men of his staff, men who will not be missed so much from the felling, the skidding or the hauling; upon the efforts of these inferior men the economic feasibility is determined of a phase of forest utilization, which, by reason of its efficacy in reducing fire hazard, is highly desired. More frequently the foreman, and even the men, are fully aware that the employer himself is skeptical as to the economic possibility of brush disposal, particularly if it is going to enhance his cost of production; under such conditions it is hardly to be expected that they will exert themselves unduly to demonstrate that brush disposal may be feasible. ✓

Compare the attitude just described to the opposite, and very much more constructive one; namely, that as brush disposal will greatly reduce the fire hazard, what is the very lowest cost for which it can be effected? As against the skeptical frame of mind under which some operators have approached brush disposal *experiments*, compare the mental attitude of the operator who approaches slash disposal from the viewpoint that it is by the terms of his license an essential requirement of his timber contract, in an *actual commercial* operation. He is faced with the necessity of disposing of his slash just as firmly as he is required to conform to any other condition of his contract; if he cannot dispose of his slash and still secure a profit from his operation, he is doomed to failure. Manifestly, beset by a vigorous requirement that he should do so, he sets about the job in a manner entirely different from the other man who

may simply be trying to establish as a fact some preconceived opinion that it cannot be done; his employees are fully apprised of the fact that it has to be done, and if, by insufficient attention to details of the project they saddle the employer with undue costs, they are rather forcibly brought to time.

The only justifiable reason for a conclusion that brush disposal is not economically practicable would be that it never was accomplished at reasonable cost. Notwithstanding the arguments that have been repeatedly placed before the Commission to the effect that brush disposal would impose additional costs of three, four or even six dollars per thousand feet of lumber produced, the Commission has been at pains to enquire into costs of such operations in the only part of Canada where brush disposal has been consistently required and enforced, namely on the forest reserves in Western Canada. For a period of twelve years the federal forestry service has persistently developed brush disposal requirements as an essential feature of all sales of forest reserve timber. Faced with the certainty that they would be forced to perform the operation, timber operators in the forest reserves have been subjected to the only practical test as to economic feasibility which has so far been applied in Canada. Cost figures, all the way from 40 cents to \$1.25 per thousand board feet of lumber produced, have been stated, the former in some cases quoted by forestry officials, the latter, about the highest figure claimed by timber operators who have tried it. Neither figure may be taken as the final opinion of either class; in some cases a forest service tally will show higher costs; in others, the operators have admitted of slash disposal being carried on for from 75 cents to \$1.00 per M.

Whatever the exact cost may have been under the varying conditions, how greatly at variance are these figures with those so frequently put forward by the operator who has never submitted the process to practical test. With the latter, slash disposal is apparently an utter impossibility; with the former, it is an established fact. When such cases are presented to operators in regions where slash disposal has never been required or properly tried, the invariable rejoinder is that "conditions are different in our country." It verily seems that the conditions in every region where there exists an inborn hostility to slash disposal are "entirely different" from those which obtain in regions where brush disposal is successfully practised. Actually, however, the essential difference in conditions more frequently relates to the laws applied, and the attitude of both timber operators and the public, rather than to any outstanding difference in the conditions affecting the problem itself. A white spruce stand in northern Manitoba, Saskatchewan or Alberta, is directly comparable to a white spruce stand in Ontario, Quebec, New Brunswick or Nova Scotia. All of the conditions or difficulties which are presumed to render brush disposal so impossible of application in the eastern provinces, are to be found in some parts of the prairie provinces where brush disposal is successfully carried on. For instance, the difficulties of burning wet brush are frequently urged as the preventing factor in brush disposal during the New Brunswick or Nova Scotia winters; can these conditions be said to exceed the wetness of brush piles subject to the extremely sudden thaws caused by Chinook winds in Alberta? Again, the danger of burning at any other time is frequently cited as the insurmountable obstacle to brush disposal in Eastern Canada; can the average fire hazard in any part of the east be compared to that which obtains in many parts of Western Canada, where droughts are frequent, and high winds more prevalent? In any case, as has previously been pointed out, if the difficulty of burning is the main deterrent, how greatly the fire hazard would be reduced even by proper piling.

It may further be pointed out that in the slash disposal operations on forest reserves in western Canada, the operators are in direct competition with other operators on licensed timber berths; in fact, in some instances, the operator

SESSIONAL PAPER No. 310

carries on under the two methods. How then, it may be asked, can the operator upon whom slash disposal is imposed compete with his neighbour; or how is it that the one operator will work under both methods when one must be the cheaper? While the Commission manifestly cannot adopt the position that the operation with slash disposal as a requisite is less expensive than the other, it has at least been drawn to our attention that the practice, efficiently carried out at the proper time, has some features which compensate at least in part for the expenditure involved. Slash disposal may require the addition of a man to the felling crew, but when the brush is disposed of, the subsequent operations of skidding are rendered less difficult. It is strongly doubted that these compensating factors can ever entirely overcome the added cost imposed by brush disposal, but they naturally must have some effect in reducing it.

All of these arguments presuppose that the process shall be efficiently carried out. Time and again, in attacking the project, operators have simply instructed the men to "pile and burn" it, only to find that they were required to return and perform the operation over again. The expense of brush disposal is in the handling of the brush; therefore, if it has to be handled twice, the operation may be twice as expensive—sometimes even more. The operator who realizes this, and insists on proper methods in the first place, is the one who shoulders the least cost of this phase of his logging operations; he is also the one who first realizes the possibilities in the practice, and on subsequent occasions is able to make a higher tender on the next sale, than can the operator who, having never attempted to secure efficiency in brush disposal, figures too highly upon this phase of the operation.

Nevertheless, with the added cost, how can such operators successfully compete? Simply by calculating the lowest possible figure for which adequate brush disposal may be carried out, and which through actual experience they have learned, deducting that from the amount which he could otherwise bid, and tendering on that basis. Moreover, frequently the operator himself shoulders a part of it, but, in the final analysis, the bulk of it is borne by the government, or more correctly, the people of Canada. This is the case where brush disposal is confined to one region. Notwithstanding the fact that the people pay, by a small reduction in the revenue received from such operations, it pays—in fire protection.

This leads to another phase of the problem of brush disposal, and as to whether it should be applied. More frequently, the timber operator may incline too strongly to the opinion that on licensed timber lands his own view as to whether brush disposal is possible or not must be accepted. In Canada, we boast that the people still control 85 or 90 per cent of the forest area, because, in addition to an interest in the timber, the soil rights have been retained in the Crown. In other words, we take great pride in the thought that we may impose such restrictions upon the uses of timber land as will ensure proper treatment. Can it, however, be claimed that enjoying this right, the people of Canada are demanding proper treatment? If so, in what direction? As a matter of fact, are these licensed lands being handled one whit better than the privately owned timber land? Still another feature in the problem is the fact that in the final reckoning the people must in any case, pay the cost of additional requirements which through their governments they may impose upon timber operators. If, therefore, the fire hazard, and losses consequent thereupon, are so great that some radical steps must be taken to reduce it, even at increased cost of the final product, by what means or right may an individual operator oppose the public desire and the public necessity?

As for privately-owned timber, if the fire hazard consequent upon accumulated slash is such as to endanger other resources, surely there exists a public right that restrictions calculated to remove or reduce the danger should be

enforced. That power is held and exerted by the State in many other directions where private property interests are involved. Wherein can a timber property, or the operation of it, claim exemption from restrictions which may be necessary to assure the safety of the public domain?

In the foregoing discussion, we have struck at the roots of the slash question. If a satisfactory solution is to be arrived at, slash disposal requirements must be applied throughout the country: they must apply to both privately owned and publicly controlled timber lands. The methods to be applied cannot be entirely uniform, but at least they can all recognize that the necessity for their imposition lies in the hazard of slash, and that in the material reduction of that hazard lies the objective. Manifestly, the Commission, with its comparatively brief study, may not dictate the methods which should be adopted. We may only reiterate that the hazard of the slash is such that our rapidly dwindling resources cannot longer withstand the losses occasioned from this source; that there already exist cases where the practice is successfully carried out on a commercial scale; finally, that these point the way to widespread and effective action by the federal and provincial governments in Canada, for the prevention of the further accumulation of slash hazards in the timber-lands of this country. We anticipate the question that if Canada were to adopt such action, how would we compete with our great neighbour, the United States, where also there exist similar needs. That phase of the question we must leave until international aspects of forest conservation are discussed in Chapter XI.

(c) THE USE OF FOREST INCREMENT

The principles underlying the handling of forests for sustained yield have been the subject of constant reference throughout this report. It is, therefore, almost unnecessary to state that if a greater amount of timber be removed from the forest that it can annually produce, there must result a steady decrease in the volume of the growing stock. An area consisting entirely of mature timber might naturally be subjected to heavier cutting, but elsewhere provision must be made that an increment of corresponding volume is being obtained.

Nowhere in Canada have these principles been applied. In those parts of the country where the actual increment may perhaps approximate or even exceed the amount annually utilized, the entire balance is disturbed by fire and other losses. Moreover, as previously pointed out, we know so little as to what our annual increment may be, that in very few places, indeed if anywhere, has any practical application of the principle of sustained yield been effected. The forest reserves which are under at least a crude form of management offer the best opportunity for immediate application of the principle. Many studies must be carried out before the exact state of balance can be determined, but it may be pointed out that when, by reason of serious depletion in timber supplies, we in Canada are rapidly coming to the stage where we will of necessity have to adopt the economic principle of sustained yield, the more we may now do by way of preparation, the further we may go in development of methods adapted to our conditions, the better and the earlier will we be able to apply proper business methods to the conduct of our forest business.

For these reasons the Commission strongly urges that forest reserves already existing should be placed under management for sustained yield; and that the areas under such form of treatment should be expanded as rapidly as possible. By such action, we shall not only take into consideration the needs of future generations, but we will be recognizing the existing urgency for the more rational treatment of our forest resources for the benefit of the present generation.

(d) FOREST UTILIZATION AT A PROFIT

While there are several countries where the phase of utilization is handled directly as a state function, on this continent we have followed the practice of harvesting our timber entirely through private enterprise. Although there are very restricted localities in this country where state operation of timber may not be very far distant, in the main it is entirely probable that to private enterprise the business of bringing the products of the forest to the markets will be left. If this be the case, there must continue the necessity of providing a profit to private industries so engaged.

The extent of forest industries in Canada has been discussed in some detail in Part I. At this stage we are not so interested in the extent of them, as in their continuance on a permanent basis; our interest is to determine by what means permanent supplies of the raw material essential to continuance of such industries, may be ensured. In the foregoing pages there have been described the various factors in present methods of utilization which operate against permanency in wood supplies. That the adoption of more conservative methods of utilization, and of more adequate fire protection, are required, has been made abundantly clear. How then are we to go about it? Although fortunes have been made in the timber industry, they have probably not been so frequent as has been the case in other industrial activities. Many forest industries of the present day are beset with financial difficulties. Their continuance is essential to our economic development, and we must, therefore, leave a reasonable profit in the business. Under these circumstances we cannot simply say: the cost of all reforms must be borne by the industry. Rather, if we are to enforce methods which will ensure the reproduction of young timber; if we are to adequately protect our forests, and in so doing enforce slash disposal requirements; if we are to limit ourselves to the annual yield of our timber areas; and if we are to effect other requirements aimed at perpetuation of the forest resource; the people of Canada must in large measure shoulder the burden, by subjecting themselves to the inevitably higher costs of wood products entailed in such methods. Had we started earlier in the game, the burden would be less severe; but we must now face the issue under conditions which have been brought about by our own neglect. There is nothing to be gained by attributing present difficulties to a past generation; the present generation has by huge industrial development and by careless treatment of the wood supplies—in spite of the examples and experiences of other nations made available for its guidance—been in large measure responsible for present conditions.

Very much apropos in the present discussion is a reference to the question of taxation of timber properties and timber industries. Throughout the land the one effort seems to be to impose such taxes, whether they be in the form of land rentals or business assessments, which have only one object in view, viz., the attaining of revenue. In many instances the method or extent of such charges is such as to operate against attainment of the ideals of forestry—permanent timber production. Very naturally a timber land owner, or even the holder of a timber license, who is subjected to continually increasing rates of taxation, sooner or later reaches the stage where he will “operate the timber for all it is worth” and abandon any claim to what remains; the remnants in such cases are frequently sheer waste, or soon become so. Rather humanly, perhaps, such methods of treating timber-holders appeal rather strongly to the public, but they result in a constant increase in the price of wood products nevertheless, and the good public pays; there is, however, a stage in taxation where the industries must cease passing on the added costs—the stage where foreign competition enters into the problem. The inevitable result is that at this point the operator must “take it out on the timber” or go to the wall.

The Commission is, obviously, not in a position to deal in detail with the question of forest taxation as that is of itself an intricate problem, involving many phases of economics. Suffice it to say that there is great merit in the principle of basing timber taxation upon the yield of timber-lands at the time of harvest, rather than upon the inequitable basis of areas and continuous application of charges, to get rid of which many valuable areas are subjected to the most destructive utilization.

Looking at the question of taxation of timber in its broader aspects, the state is quite justified in expecting a profit on the business of handling a natural resource; is it however justified in the continuance of present practice? Seriously depleted as they are, must our forest resources still be called upon to pay for the establishment of manifold public works; are we justified in the present state of that resource, in extracting revenues in the ratio of six-to-one, five-to-one, or even four-to-one? Surely there is some other phase of our manifold human activities that can be made to shoulder its proper burden. Surely something can be done to prevent the further diversion from their proper use of funds extracted from the forest. The present condition of the forest resource is in itself undeniable evidence that some other operation in our economic life is escaping its proper burden, because the revenues which are extracted from the forest and diverted to other uses, are in large measure drawn from the woods' capital.

CHRISTMAS TREES

While really foreign to our work, the question of Christmas trees has so frequently been raised that at least brief reference to it will not be amiss. On all sides people object strongly to the permitting of extensive cutting of trees for this purpose. It should be pointed out that so long as use is confined to such trees as will properly serve the purpose,—that is, bushy trees, grown in the open,—there is no economic loss in the practice; indeed it is a legitimate business. The practice of lopping the tops from large trees merely to utilize a part of them, however, is strongly to be condemned.

CHAPTER X—OTHER FORESTRY ACTIVITIES

So far, our discussion has referred more particularly to forestry activities on state-controlled lands. After all, in Canada the great bulk of forest lands are still in public ownership, and the methods to be applied on such lands therefore constitute the main problem. Aside from this, however, there are two or three directions in which forestry may be practised, and although in Canada steps which have so far been taken in this direction are very limited, it is desirable that some reference at least be made to them.

(1) MUNICIPAL FORESTS

Particularly in the older provinces where extensive tracts of land have, during past generations, been rendered practically devoid of timber, there have developed barren areas which, if they are to be put to some use, and if they are to be prevented from causing damage to the better farm lands in the same regions by giving rise to blow-sands, must be re-established with forest cover. In various parts of Europe municipal or communal forests have been established with various objects in view; in some cases for the fixing of lighter soils that are subject to drifting; in others to take advantage of the ameliorative effect of forest upon extremes of climate, and for aesthetic reasons; in others, for the protection and purification of the municipal water supply; finally, in some cases for the essential purpose of providing wood supplies. Indeed, in Europe there are some municipalities which have reached that happy state where the public forests

SESSIONAL PAPER No. 310

have become so productive that they carry in considerable measure the expenses of municipal administration, and thereby reduce the amount which it would otherwise be necessary to exact from the citizens under various forms of taxation.

In Canada only a small beginning has been made in the development of municipal forests—this action being for the most part confined to the province of Ontario, where recently the government has provided legislation and taken certain action to provide assistance to municipalities who undertake the establishment of municipal forests. Although in earlier days the older parts of the province carried magnificent stands of timber, through continuous exploitation for agricultural uses timber has in many regions become exceedingly scarce. In fact, even the farm woodlots have been subjected to severe depletion, and in many instances, through lack of protection against grazing, their condition has seriously deteriorated.

The possibility of accomplishing much good work in the direction of municipal forests is not, however, confined to this province. Parts of Quebec, parts of New Brunswick, and perhaps even more extensively in the province of Nova Scotia where private ownership of lands predominates, great opportunity exists for the establishment of public forests, through municipal efforts, which will serve the local requirements of their people. Entirely aside from the question as to whether such municipalities have the power under their charters to engage in pursuits of this character, however, it may be pointed out that the only basis upon which reasonable development of this kind might be expected would be in the display of a considerable amount of interest in the whole subject by the governments. There are so many intricacies involved in work of this character, there are such great liabilities to loss, and finally so much is to be gained by the adoption of standard methods which ensure success, that governmental support and interest in work of this character is of the greatest possible moment.

(2) PRIVATE FORESTS

So far as the practice of private forestry over appreciable areas is concerned, it is in a large measure confined to the operation of various corporations who, in the acquirement of timber lands, have come into possession of extensive tracts of privately owned land. After all it is only within comparatively recent times that private corporations have shown any great interest in the possibilities of rational forest practice, and to a large extent the existence of such interest is confined to pulp companies, who on account of their large financial investment in plant, realize the necessity of perpetuating their timber supplies. While in isolated cases lumbering concerns have in a measure evinced a similar interest, this has not been nearly so evident as in the case of pulp companies.

Nowhere may it be said, however, that private forests held by corporations are under intensive forest management. More frequently development is in its initial stages, and foresters have been primarily employed upon survey and mapping of forests and upon the preparation of working plans, rather than in actually applying intensive forest regulation. In some cases, companies have established forest nurseries of considerable extent, and taking advantage of the young stock so produced, have planted up limited areas of denuded forest lands. In one case the nursery operated by a private company now contains over 20 million seedlings and transplants, and the same company has so far planted up some 2,500 acres of unproductive land. The few other companies who have engaged in this line of endeavour have planted relatively smaller tracts.

In view of the fact that forest industries have, under our methods, been developed exclusively by private enterprise, the corporations must in some measure be depended upon for the development of proper forest practice. Under

these circumstances there is a strong desirability, if not an actual necessity, that the governments concerned should, even at some cost, display a vital interest in and give encouragement to operations of this character. It may also be stated that, whereas these companies also control under license large areas of forest lands, the governments are in a position through co-operative work with such companies to gradually but surely work toward the better management of licensed timber lands.

3. TREE PLANTING

The third phase of private forestry operations lies in the plantation of woodlots or shelterbelts. In many parts of Canada the remnants of the original forest furnish the farmer with an excellent basis for the retention and proper management of a woodlot. It is hardly necessary to enlarge upon the benefits accruing from farm woodlots. Although the careless treatment to which some woodlots are subjected would appear to indicate a lack in appreciation of their value, still there is pretty firmly impressed in the minds of the rural populace the desirability of having conveniently at hand a small tract of timber.

If it be considered as an essential requirement in any farming community that there should be at least some part of the area retained under forest cover, the consumption must also include the premise that the woodlots should be properly handled. A very great deal is done by the various governments in this country for the guidance and advice of farmers in the production of regular products of the farm, and there just as surely devolves upon the same governments the necessity for providing every encouragement and help in proper treatment of the woodlot. The value of woodlots from the standpoint of economic production on the farms in Canada has been rather fully elucidated in Part I, Chapter X, Section 6c. It is there pointed out that the production of wood products on the farm is vastly greater than it is by the average person believed to be. Under such circumstances the engagement of governments in pursuits aimed at the improvement of the methods under which farm woodlots are handled is fully justified by the economic requirements of the country.

Excellent opportunity in this direction exists in the eastern provinces. In Ontario, for instance, the government does evince a certain amount of interest in these problems. It may be pointed out, however, that the work is one which should be carried out over broad regions. Great economic loss is involved if in one particular region large sums of money are expended in the planting up of new woodlots when in another part of the province, through careless treatment on the part of owners, woodlots may rapidly be degenerating. In Quebec, and also more particularly in the provinces of New Brunswick and Nova Scotia, excellent opportunities exist for government activity in the better development of farm woodlots.

Perhaps, however, the desirability of woodlots is more thoroughly appreciated by the farmer who does not happen to possess any timbered lands than it is by any other individual. Although tree planting is very necessary in some regions where timber may be a natural product of the soil, there are other districts in which, during the period of civilization at least, no timber stand has existed, and where, if anything of this nature is to be brought about, afforestation is necessary. The best example of this condition exists in some parts of the prairies, in the provinces of Manitoba, Saskatchewan, and Alberta. In these provinces the need for tree planting was thoroughly recognized by the federal government, and some twenty years ago action toward a definite policy of tree planting was inaugurated. The preliminary steps consisted in the acquirement of suitable land and the establishment at Indian Head,

SESSIONAL PAPER No. 310

Saskatchewan, of a forest nursery station. From this station, and also from a similar one further north in the province, there have, since their inception, been distributed some seventy million seedlings and cuttings. At the present time the annual distribution from these stations is in the neighborhood of five million per year. All of these seedlings and cuttings are distributed without cost other than transportation charges to many thousands of farmers located throughout the treeless portions of the prairie provinces.

At times exception has been taken by various persons to the continuance of this policy of free distribution of planting material on the ground that it constitutes undue interference with commercial enterprise. If there is one thing which is essential, however, to the success of any scheme of this character it is that the farmer must be required to perform certain fundamental duties in order that the trees planted may have a reasonable chance of development. In all cases where trees are disposed of free of charge, therefore, definite requirements both in preparation for the planting and in the subsequent treatment of the plantation are imposed upon those who take advantage of the scheme. By this means the Forest Service is better able to ensure success in the undertaking.

Aside from the foregoing, however, the position may also be advanced that inasmuch as people situated in treeless parts of the country are called upon to contribute by various means of taxation to the consolidated revenue of the Dominion, they have, perhaps, some inherent right to the benefits accruing in the application of forest policy and the expenditure of forestry funds. It may quite reasonably be argued, therefore, that entirely aside from the fact that the requirements imposed upon the farmer under consideration of free planting material the latter has every right to expect some help, some advice, and some guidance in the establishment of a shelterbelt or woodlot upon his farm in a region which has not been by nature endowed with such advantages.

In the province of Ontario, and also in Quebec, similar operations are carried out by the forest services, although to more limited extent. Naturally, in the eastern provinces where in any case timber is more frequently found growing under natural conditions, there has not been the same necessity for the adoption of large scale methods in tree planting.

Aside from its direct benefits to the farms or communities affected thereby, it may be pointed out that work of this character contributes very generally to the education of people throughout the country as to the value and advantages of the timber. If the government neglects to display some active interest in the timber needs of a timberless country, and confines its attentions and expenditures entirely to the timbered regions, it can hardly expect that the people of the former will be very active in support of reformative measures, the only effect of which is perceptible to them in the form of increased cost of wood material. Here, therefore, exists a very important reason for which people in treeless portions of the Dominion can be made to see that the benefits of the proper forest policy accrue to the people of the Dominion generally.

For the purpose of bringing the operations for tree planting—i.e., artificial regeneration—so far as they have been developed in this country, into true perspective with the work of management of natural timber lands, it may be pointed out that at the present time the total area of private plantations in existence in Canada probably does not exceed 50,000 acres, including shelterbelts, planted woodlots, and true forest plantations. Although work of this character must manifestly not be permitted to restrict the efforts put forward for the proper management of our natural forests, it is at once obvious that when such large areas of waste lands are to be found, and when there are regions so greatly in need of the benefits to be derived from forest cover, the various governments in Canada should greatly increase their interest in, and facilities for, tree planting work.

(4) SILVICULTURAL RESEARCH

One of the most essential requisites in the formulation of management plans for any forest area or region is a comprehensive knowledge of the silvicultural requirements and growth conditions in the various individual tree species, and in the numerous associations of these species which occur under natural timber conditions. Obviously, if any extensive knowledge is to be obtained on the subject of increment within the forest, it is necessary that detailed studies should be made to ascertain the rates at which the forest is actually growing; further than that, it is necessary to ascertain by what method of silvicultural treatment the natural or ordinary rates may be increased in order that the forest may be made to produce the maximum possible results.

So far, work of this character in Canada has been extremely limited. Most of the forest organizations have been so busy with problems relating to forest protection and timber administration, that as yet they have not been able to give adequate attention to this most important work, nor indeed have they been able to secure sufficient financial provision to enable them to expand in this direction. Although several of the provincial services have engaged in isolated studies of specific problems, it is more particularly in the federal organization that the development of these lines of work has primarily been brought about. The latter service through co-operation with the provincial services, and also with the timber owners, has made an excellent beginning in silvicultural studies, and with the exception of the province of Nova Scotia, where no forest service exists and consequently co-operative arrangements have therefore not been feasible, some work of this character is carried out in every province of the Dominion. By the establishment of forest experiment stations in New Brunswick, Quebec and Ontario, excellent plans have been laid for the detailed study of some of the more vital problems affecting the timber stands of eastern Canada. In the West, similar studies have been initiated on forest lands under the control of the Federal Government.

(5) FOREST PRODUCTS RESEARCH

The term forestry more properly relates to the production of timber crops. Forest conservation, however, involves not only the proper care and use of growing timber, but extends into the economic use of forest products, in order that the drain upon the timber resources may be kept within reasonable bounds. A definite function of the federal forest service, therefore, is in the conduct of forest products research which aims at the development of methods under which the final wood product may be made to serve more efficiently, and for a longer time, the needs of the people. It includes a detailed study of the chemical and physical properties of wood, including anatomy, testing, seasoning, and preservation; it includes also the study of the products of timber other than the wood itself, involving research in wood distillation; finally, it includes detailed investigation into all forms of industry which have as a basis the use of wood or other timber products.

It is unnecessary for the purposes of this report to enter into detailed discussion regarding the operation of the Forest Products Laboratories; suffice it to say, that the federal organization has a main laboratory established at McGill University at Montreal, where all lines of forest research are carried out, and as a branch to this institution there is a timber testing station at Vancouver, British Columbia. Between the two of them they serve the function of making the necessary studies and fundamental experiments, and at the same time furnish technical service to the various forest industries, many of whom have come to recognize the institution as a vital aid in their proper economic development.

CHAPTER XI—SOME INTERNATIONAL ASPECTS OF FOREST CONSERVATION AND SOME COMPARISONS

So far, our treatment has been entirely confined to Canada, and the subject might well be so confined, were it not for the fact that there are some general relations which may have some effect at least upon the degree to which conservation is practised. Although these relations cannot be dealt with in detail, some general references may be of interest.

Let us consider Canada as a nation supplying softwoods in greater or lesser degree to various countries throughout the world; eliminating the United States for the moment, just why is it that we can enter the softwood markets of Europe, India, Australia, Japan and other countries, some of whom have very considerable supplies of the softwoods? Firstly, it is because we have relatively greater quantities; secondly, because we can lay down our forest products more cheaply in those countries than they can be produced there. But why is this the case; how is it that we can sell our softwoods to India, when in the Himalayas there are very extensive softwood forests? Why can we market softwoods in Great Britain when there are extensive coniferous supplies much closer at hand in the Baltic countries, and particularly in Russia? There are several reasons, among which may be cited the following: (a) having a greater supply per capita we place less appreciation upon the actual value of wood: having always obtained it in abundant quantities at relatively low cost, we seem to regard more modestly the monetary value of wood, than do other countries; (b) in taking out our timber, we do not call for the close utilization demanded in other countries; we condone the removal of only the better material, leaving large quantities to rot in the woods, and obviously, this permits of marketing at lower cost; (c) we permit the removal of timber under systems that do not properly provide for regeneration of the stand: in our methods of management, nothing which in any manner approaches the condition implied in the term "forestry" obtains; in other words, as our forests are not handled for sustained yield, we do not pay the operating costs of such a system of management, and consequently our wood is sold to the logger at lower stumpage rates, and taken out more cheaply; and, (d) we do not even charge up against our wood the cost of adequate fire protection, for, as has previously been explained, nowhere in Canada is sufficient protection afforded.

If there be any doubt as to the accuracy of the foregoing, it is only necessary to examine the supplies now available, and the export trade in forest products, of various parts of Canada, and the proof will be found therein. In years gone by, Ontario, Quebec, New Brunswick and Nova Scotia did a large foreign trade in timber products. When, however, the square timber from Ontario and Quebec vanished, particularly the white pine, exports from these two provinces were measurably curtailed. So long as Ontario and Quebec continued to supply high grade lumber of pine or spruce, they, along with New Brunswick and Nova Scotia continued to export to the European market. As timber became less accessible to tide-water shipment, however, exports decreased. Finally, although other factors, such as present rates of exchange, and the cost of labour, undoubtedly bear upon the situation, in many parts of eastern Canada the supplies of high grade lumber have become so scarce that the opportunities for competing in the European market, which is a particular one, are in large measure restricted. In earlier days, the eastern mills used bigger logs which furnished a large percentage of high grade lumber; to-day, the timber to be seen in the log-pond of almost any mill in these provinces offers indeed a sight in sad contrast with the experience of former years; while naturally, if timber is used to a five or six inch top, this constitutes closer and better utilization; nevertheless it does not provide the high grade materials which will stand ocean freight rates, or satisfy the demands of fastidious foreign markets.

The European market has, therefore, been in great measure curtailed, so far as the eastern provinces are concerned, and this has been brought about by constant diminution in the proportion of sizable logs obtainable. By cutting out, in the early days, the larger logs, discarding much of the smaller material, and slowly but surely reducing the sizes, these provinces are now at the stage where there is great difficulty in competing in overseas trade. The eastern provinces clearly illustrate that, even without having added the costs of proper management and adequate protection, the natural trend in a country where wood supplies have at one time been plentiful is toward such extreme reduction in supplies that a crisis impends before remedial measures are taken.

Consider on the other hand, British Columbia; logs, of a size which would arouse the most envious interest of the eastern sawmill man, are shattered in logging operations, left in the woods, or destroyed in the slash-fire. With an abundance of high grade material, British Columbia can and does ship her lumber to Europe by way of the Panama canal; in fact, she can even lay down at some eastern Canadian ports certain classes of material that now rapidly obtain a market, whereas in by-gone years they would have failed entirely in competition with local products.

Considering now, the United States—our closest and best market; just why is it that we can compete there, when that country has softwood supplies two and a half times as great as our own? The cost of installing logging equipment and sawmill machinery is less in the United States than it is with us; in some districts at least, labour is cheaper, when the supply, the hours, the demands as to sustenance, climatic conditions and in some measure, the general efficiency, are considered; with a larger population, the quantities and varying grades of lumber supplied may be absorbed within a much shorter radius; all of these factors contributing to the advantage of the American operators, then, how should we be able to compete with them?—Because notwithstanding their greater actual supply, having a population some thirteen or fourteen times as large as our own and rapidly increasing, their relative supplies, if used exclusively for domestic consumption, would provide for their requirements in the ratio of one-to-five, as compared to ours. Including however, the consumption for domestic use and for export, the United States consumes softwoods in quantity close upon eight times as great as the total cut of softwoods in Canada. That the latter figure is not greater, is due very much to larger per capita consumption of softwoods for pulpwood in Canada. Under these circumstances, the American people, fully aware of their greater number, probably in many cases labouring under the belief that the ratio of consumption is even higher than indicated above, and having for this reason been brought closer to that appreciation of impending shortage in supplies,—consequently place a relatively higher value upon wood than do we. Under these circumstances stumpage rates generally are higher; timberlands are more heavily taxed; more money is spent in fire protection, and finally, utilization methods show greater care. All of these factors enhance the cost of domestic wood products, and permit of our own products competing in the American market.

Wherein lies the moral? Simply in this: almost every civilized nation in the world to-day attributes to wood a higher intrinsic value; spends more in its protection and management; insists upon more economical utilization; demands more by way of stumpage;—than we do in Canada. Under the operation of these factors, we compete, but we do so at the expense of our own forest conditions, until, as in the case in some parts of Eastern Canada, the time arrives when so far as European competition is concerned, the grades of material we can supply do not meet the foreign requirements.

The question may well be asked; if the foregoing are the underlying reasons for our temporary success, with competition as keen as it is, how could we expect to compete in the foreign markets if we were to adopt even the rudi-

SESSIONAL PAPER No. 310

mentary principles of proper forest management, and thus enhance our cost? Enlarging the problem, how can the North American continent compete against other countries if more conservative and hence more costly methods be applied? As between this continent and Europe—there is in Europe a general desire instilled in the people to conserve their supplies, but, being in financial straits, and having to compete against this continent, they in some cases, overcut the annual yield, and thus decrease their annual woods' charges by reduction in the efficiency of management. If the competition from the American continent were less keen, they would not sacrifice good management to the same extent. If competition from this continent, however, were more severe, probably more of the principles of proper forest management, in certain parts of Europe at least, would go by the board.

Similarly, as between Canada and the United States—the latter is spending more in protection and management of her forests; the financial burden borne by her forest industry is greater—both in spite of competition from Canada. The question arises,—if Canada were to increase her expenditure for protection and management; if she were through additional charges upon operators (collected ultimately, of course, from the consumer of timber products) would not our American neighbours themselves, feeling a temporary relief at least, see the opportunity for the better, if more expensive, treatment of their timber lands?

After all, is not this what is happening all the time? One nation adopts a policy aimed at better methods in some phases of its administration; other nations follow. In so far as this situation applies to forest resources, the unfortunate feature of it is that it apparently takes a nation well nigh on the brink of exhaustion to start things working in the opposite direction. By way of analogy,—several commercial concerns in severe competition go through a stage of price cutting, until they are selling below cost; one or two go to the wall, giving slight relief; another two or three raise prices a little, to, or above, the cost of production, and the balance have the choice of doing likewise or going out of business. In this enlightened age we even have abundant evidences of "fixing prices up", rather than cutting them down! A little of the same principle, in conservation,—applied as between regions of a country as between countries of a continent, as between continents—will do much for the relief of all. Most assuredly, if in Canada we are selling our wood supplies more cheaply than we can, even under the crude methods which we follow, reproduce them, we are truly engaging in a process that is nothing more than "price-cutting"; we are eating into our capital, precisely in the same manner as the commercial price-cutter who must disturb some fund other than legitimate profits to offset the "cuts".

In view of the timber situation in that country, the United States can well afford to subject her forest industries to reasonable competition. In any particular forest industry in that country, there is just as much desire for protection from severe competition as is the case in any other industry; but, notwithstanding the fact that outside competition could in a considerable measure be overcome by the reduction in protection charges, taxation and the like, in the United States these charges are maintained on a higher level, even, than they are in Canada. Before proceeding with the discussion of the main subject, and, recognizing American operators as our chief competitors, both in the United States and in other parts of the world, it will be well worth while to draw some comparisons in the degree to which conservation measures are applied in that country and in Canada.

As previously stated, the United States has two and a half times the supply of softwood timber that we have, but about 80 per cent of it is in private ownership. On account of a much larger population, however, as a nation they

have earlier been brought to a realization of impending shortage in supplies, particularly in some districts; the fact that 80 per cent of their timber is privately owned is therefore significant; it indicates that, in spite of the fact that only one-fifth of the timber resources are subject to government control, they have as a people seen fit to impose upon themselves measures of conservation considerably in advance of, and involving greater expenditure than, requirements of similar character in Canada. Owing to many political divisions in the United States, it is obviously out of the question to make a complete comparison between forestry activities in that country and Canada. We may, however, take the federal organizations,—in each case, they comprise the most extensive organization, and carry on their work over widespread areas.

The United States Forest Service administers 157 million acres of National Forest lands. Of this acreage, some 3 million acres is situated in the Eastern States, most of it having been acquired by repurchase under the "Weeks Law"; 20½ million acres in Alaska; and 133 million acres in the western States, the latter directly comparable to the 22 million acres of forest reserves under control of the federal forestry service in western Canada. It will be immediately noted that the area of federal forests in the western United States is about six times as great as that of the federal forests in western Canada. On all federal forests in the United States the expenditure is upwards of \$6,000,000. In Canada about \$650,000 is spent in their upkeep and development; in addition however, the Canadian service is responsible for protection on some 180 million acres of unreserved timberlands, upon which the expenditure is about \$225,000. From the foregoing, it is at once perceived that not only have our neighbours gone a very great deal farther in the dedication of lands to permanent forest production, but in their protection, management and development, they make very much more liberal financial provision.

Special mention may be made of the national forests in eastern United States. Previously, the great bulk of timberlands in the east had passed into private hands, but in 1911 the "Weeks Law" made provision for the repurchase of absolute forest lands. By reason of great complications in State boundaries, due to the many political divisions, and also owing to a certain lack of State interest, it was considered to be in the national interest that public forests should be established. In a period of twelve years about 2 million acres have been purchased with a total expenditure of over 10 million dollars; this added to other public lands, brings the total area of National Forests in the eastern States to over 3 million acres. This indicates a phase of federal activities in forestry unknown in Canada. The claim is not made that conditions in Canada demand a similar method here, but it nevertheless clearly demonstrates that in United States clear recognition has been given to the principle that, regardless of conditions of land tenure, the national government must take a direct interest in the betterment of forest conditions and forest policy from the Atlantic to the Pacific.

This conception is even more clearly exemplified in the recent enactment of the McNary-Clarke Bills, in the United States Senate and the House of Representatives, respectively. After a thorough enquiry by a Committee, that body recommended and secured the passage of the Bills referred to, by which the federal government has committed itself to yearly statutory appropriations of \$2,700,000 to be devoted to co-operative work with the individual states in forestry. Of this amount \$2,500,000 is appropriated for co-operative fire protection, and for the investigation of forest conditions and the studies of forest taxation. The balance of \$200,000 is appropriated in two equal amounts for co-operation with the individual states in tree planting, and in the development of shelterbelts and woodlots. The same bill makes further provision for the creation of additional national forests, thus continuing and augmenting the policy inaugurated many years ago.

SESSIONAL PAPER No. 310

Here indeed is an example of constructive statesmanship. That the federal government, in addition to over six millions now spent in forestry work, should make available upon the principle of state co-operation, an annual fund of nearly two-and-three-quarter million dollars, the great bulk of which is for forest protection, the balance for the upbuilding of new forests, assuredly indicates that our neighbours have awakened to the peril with which their forest resources are beset. Other examples, in State forest activities, might be cited; indeed many lessons may be learned from private organizations in that country; but the federal example will suffice to establish the argument that Canada is seriously lagging behind her most important competitor, in the appreciation which is attached to, and the protection afforded, her forest resources.

It surely requires no further argument to demonstrate the weakness of our present condition; it is surely evident that if we do not apply relatively as great, or perhaps even greater, effort in forest conservation, our resources must continue to decline to that state where we shall be unable to compete. While there is room for collaboration with our neighbours on matters of forest policy, the stage has long since been passed, when we may afford to merely *follow* in measures of conservation. It is puerile to urge that unless our neighbours do something, it is impossible for us to do that thing. Indeed, the situation demands that, benefiting so far as we can from the experience of other nations, we should strike out for ourselves and march forward on a policy which has as its basis the perpetuation of the forest resources. We are prone to proclaim our independence, and our national vigour; let us sweep aside misgivings as to what may happen if we pursue better methods of forest management, if we continue in our present course we shall ere long have little to conserve, and of what avail will markets then be? If on the other hand, we embark on a policy that aims at the proper protection and development of our forests, we will not alone be the gainers; *all* nations are anxious and waiting to apply the principles of conservation, but as is the case in all other lines of activity the "price-cutter" while he lasts, sets the pace in the application of the economic law of capital and legitimate profits.

CHAPTER XII—CONCLUSIONS AND RECOMMENDATIONS

As typifying relative attitudes in certain parts of Europe, in the United States, and in Canada, respectively, we may use an analogy..... "A", "B", and "C" are three individuals of different age; of different degree, in possession of world means; and of different temperament, largely the result of environment. "A" has, through the thrift of his forefathers, become possessed of an estate which, although not so restricted as to prevent him from tampering with the principal, consists largely in sound investments which furnish the wherewithal for his comfortable existence. In addition to the estate, however, he inherits also a spirit of providence, wisdom, and of responsibility. He goes through life, living upon the just profits of his property, and in addition to living a life of contentment, he dies in the knowledge that he has not dissipated his estate; he has fully met his responsibilities..... (Europe).

"B" is the son of a race, the first of which suddenly came into possession of a huge estate, far surpassing in extent the more modest belongings of "A". His forefathers, however, were not so provident; some parts of the estate were so inaccessible that they were unable to tamper therewith; but for that which was accessible, they dissipated in great degree the capital therein. Nevertheless, when "B" arrived upon the scene, he received an inheritance which, although sadly reduced from its original value, was still of relatively large proportions. He inherited also the improvidence of his ancestors, and carried on along lines very similar to those pursued by them. By reason of past dissipation of some of the

more desirable properties, he has perforce to be a little more careful, but he nevertheless neglects to resuscitate those parts which have been mistreated, and continues to eat into the capital of the remainder. Having raised a large family of twelve* children, however, he becomes obsessed with the fear that continued dissipation of his estate, although it would permit of greater luxury for himself and his family, will in the end provide only a parsimony for each one of them; having before him, also, manifold examples of the failure of businesses conducted along similar lines, he feels that perhaps even he may in his later years feel the pinch. He realizes that, having lived in affluence, his friends, knowing the extent of the estate of which he became possessed by inheritance, will think unkindly of him if he should leave it impoverished. His pride is touched, and he sets about to moderate his yearly demands, and to save his resources from further depreciation; realizing the pleasure and virtue in his changed life, he goes even further and endeavours to build it up slowly but surely, so far as his circumstances and his energy may permit. (United States).

"C" comes of similar stock, and becomes possessed of an estate which has gone through a process somewhat similar to "B's". Having only one* child, he is not at such an early stage obsessed by fears that have harried "B". With a very small family he may put on more "side" than can "B" with his twelve; notwithstanding the fact that his actual estate is less than half what "B's" may be, he feels and tries to demonstrate to the world that he really has more. By the extent to which he relatively exceeds the annual expenditure of "B", is determined the time at which "C", too, is stricken with fears as to the future income for himself and his family of one. (Canada).

In every-day business life, measures are frequently taken to forestall the sequence of events portrayed above. Many men who have accumulated fortunes place the handling of their estates in the hands of a trust company, or other reliable executors, who may be depended upon to preserve the assets, and thus protect the good name of the family in the community.

In observance of similar principles, the people of a community, of a province, or of a country, formulate a constitution and elect a government to transact their public business, and to preserve the estate of which they are collectively possessed. As we do in almost every other line of human activity, therefore, can we not apply the same principles of wisdom, providence, and foresight in our treatment of the forest resources? Our governments are elected, not only for the purpose of collecting revenue and making expenditures, but also for the business-like administration of our natural assets. We expect governments to look to our own welfare, but, unless we demean ourselves as a nation, we must expect them to preserve the assets of the state. We take good care to see that future generations shall participate in the costs of preserving the state by warfare during our generation: we therefore have the responsibility of maintaining the natural assets in a state of productivity, that future generations in turn may have the wherewithal to pay.

So much for our national responsibilities,—we have still others which concern our internal economy. In bestowing upon those provinces which control their natural resources the monetary benefits to be derived from the management of their timber wealth, Confederation did not absolve them from the responsibility of so conducting their forest business that they would contribute also to the national welfare; nor did Confederation absolve the federal government from exercising a national interest in and responsibility for the application of proper care of the forest heritage of the Dominion. Functions, as between the Provinces and the Dominion, are intricately interlaced; there are extremes to which neither one should go, or can go, without infringement upon the autonomy of the other; but jointly, they bear a great responsibility in seeing that such

* The population of the United States being some twelve or thirteen times that of Canada.

SESSIONAL PAPER No. 310

measures as may be applied will redound to the national advantage. We are one people; as a unit, we extract national revenues and apply expenditures throughout the Dominion in other lines of activity. Similarly, as application of the principles of conservation demand concerted action, we must as a united people formulate and apply such methods as will observe those principles.

It has been shown that in the Maritime Provinces the timber situation is very serious, not only as a result of fire and other losses, but also through depletion due to excessive utilization; it has been demonstrated that in Quebec, Ontario, and in the Prairie Provinces, a serious situation exists in solution of which the fire problem and utilization methods play a vital part; it has been made clear that in British Columbia, although the timber resources exceed those of the balance of the Dominion, here too, serious inroads have been made upon the forest by fire, and that methods of utilization are wasteful. Yet, we cannot simply say: as resources are exhausted elsewhere, British Columbia will supply the need; such a conclusion involves the leaving unproductive of the greater part of the land area of all other provinces, when they can and should be made productive.

Our past neglect has, it is true, brought us to that stage where, during the process of rehabilitating the forest resources in other parts of Canada, we must in a measure depend upon British Columbia. Owing to the limited extent to which the latter province can participate in agricultural development, as compared to other provinces where opportunities in that direction are much greater, does not this very condition of itself lead to the conclusion that the people of Canada, represented by the federal government, have a direct responsibility in the preservation of the forests in British Columbia? If there be justification for the expenditure of relatively large sums of money in the development of agriculture in other provinces, in order that they may produce in greater volume, is there not a similar justification for the exercising of greater interest in the forest problems of British Columbia? Likewise, the forest problems of other parts of the Dominion, being of national consequence, demand the display of federal interest. To bring these matters into their true perspective, we must cease so closely confining our attention to the revenue-producing aspects of the forest resources; we must recognize some of the national aspects of the problem of forest conservation, and apply ourselves as one people to their solution. ✓

RECOMMENDATIONS

From the evidence as to the extent of our forest resources, presented in Part I, and from the description of the shortcomings in our present methods of handling those resources, it is only necessary to conclude that definite, radical, and constructive steps in forest conservation are of transcending importance if Canada is to protect and further develop her forest industries, and as a country to engage in world trade in forest products. We are still dissipating our woods' capital, perhaps more than any other nation in the world; our forest industry is a gigantic one, and even if we are to consider only the preservation of that, we must conserve the raw materials on which it depends.

Fully recognizing that, as a non-technical body, we are not called upon to go into detailed recommendations regarding the intricacies of forestry practice which are manifestly the concern of the technical forest services, the Commission has in the foregoing pages attempted to point to the *practical* weaknesses and the *business* shortcomings of our present methods. Based upon those explanations, there are presented herewith the recommendations which the Commission has to offer, strongly urging that all of them are essential to the formulation and execution of a rational forest policy in Canada. Although the Commission was appointed under federal authority, we have during the course of our studies

been imbued with a pressing duty to apply ourselves to provincial as well as federal problems, as they are intimately related; for these reasons we have considered the whole problem.

1. LAND CLASSIFICATION

(a) That the federal government should pursue more vigorously the classifying of lands which come under its control, with a view to assigning them to permanent forest production. The technical organization for this work already exists: it requires expansion and greater financial support.

(b) That provinces which control their own resources should develop local machinery for land-classification work, and within their boundaries apply the procedure outlined in (a).

(c) That, owing to the existence in all provinces of the Dominion of large areas of unproductive land quite capable of producing forest crops, and to the national necessity that these lands should be put to economic use, it is incumbent upon the Federal Government, in addition to treating with lands directly under its control, to foster by whatever means or methods may be possible, a consistent and comprehensive plan of land-classification for all lands where there is question as to the proper economic use, throughout the Dominion. Great economy will be effected if the Provinces co-operate with the Dominion and concede to the latter the responsibility of bringing about standardized methods in this work.

2. DEDICATION OF FOREST LANDS

(a) That Dominion lands already classified as true forest lands should be permanently assigned to forest production by their creation as National Forests; and that, as and when additional areas are classified as such, they too should be permanently dedicated.

(b) That similar action be taken in those provinces where direct control is exercised in forestry matters; and that in Nova Scotia, in particular, definite provision be made, and concrete action be taken by the province, for the dedication as provincial forests of all timber lands remaining in the Crown, and the addition thereto of forest areas which may be acquired by purchase at reasonable cost, to the end that a reasonable proportion of the forest lands of that province may be placed and managed directly under public control.

(c) That the federal government exert all possible efforts in assisting to the consummation of the objects outlined in (b), so that, throughout the Dominion, there may be developed a complete chain of publicly owned forests. The position is not taken that all true forest lands should be in public ownership, for that might stifle initiative; rather, that each province should have within its boundaries considerable areas of publicly owned and managed forests, in order to ensure continuity in supplies for forest industries, and to provide protection to stream flow.

3. FOREST LEGISLATION

(a) That the federal government should thoroughly revise its forest legislation in such a manner as to make a clear definition of its forest policy, and more adequately provide for enforcement of principles of that policy upon lands subject to federal control; and that such legislation should make thorough provision for other forestry activities consequent upon the responsibilities of the federal government in developing, through co-operation with the provinces, a national forestry policy and program of Dominion-wide application.

SESSIONAL PAPER No. 310

(b) That provinces exercising control over their forest resources should thoroughly review the legislation in which the forest policy is defined, and upon the basis of which their respective forest services operate, bringing into clearer definition the essential requirements of the policy, and providing for proper management of their forest lands. In cases where no comprehensive forest law now exists, action toward that end should be taken without further delay. There is no province or region in Canada where modern forest legislation is not urgently required for the proper conduct of the forest business.

(a) That for the accomplishment of both (a) and (b) the federal government, as far as the limitations of provincial autonomy may permit, exercise such effort as may be within its power to encourage and develop greater uniformity in forest legislation throughout the Dominion.

4. FOREST AUTHORITIES

(a) That the federal government under the authority of more adequate legislation, suggested in 3a, above, should thoroughly reconstitute and enlarge its present forest service, centralizing therein all functions pertaining to forest production, protection and management, now seriously scattered throughout various branches, to the detriment of economical and efficient administration; that in so doing primary consideration shall be given to the object in view; and that the policy to be formulated, and the service created for its enforcement, shall exhibit the extent and dignity justified by the handling of Canada's second greatest natural resource. In no manner should the proper management of true forest lands be limited or circumscribed by other considerations or organizations.

(b) That the organization and status of the individual provincial services should be thoroughly reviewed by the respective governments, and that where weaknesses in the authority are found to exist, or where the carrying out of the fundamental principles of forest policy are being neglected, steps should be taken to improve conditions in that behalf; and particularly, that the province of Nova Scotia should definitely constitute a forest authority, for the purpose of developing and perpetuating the forest resources and forest industries of that province.

(c) That in re-organizing its forest service full cognizance should be taken of the fact that the federal government has certain functions to perform, even in provinces which control their own resources, and that the forest service must be properly constituted and provided with adequate funds to that end.

Note:—The Commission strongly advises that more serious consideration be given to the providing of appropriate but practical uniforms for forest officers. This will contribute to greater esprit de corps and bring the services into greater respect with the public. It may also be stated that in many cases the services are subjected to serious depletion in staff through the inadequacy of the salaries paid.

5. FOREST PROTECTION

(a) That in view of the serious depletion annually sustained in forest resources on federal timber lands, more adequate financial provision should be made, to permit of the present protective services being enlarged upon and greatly improved; that in making such financial provision, recognition be given to the fact that forest protection entails the provision of adequate improvements and facilities, which should be considered as capital expenditure.

(b) That similar action be taken by the provinces which exercise the function of forest protection, to the end that forest resources within their boundaries may be more adequately protected.

(c) That for reasons which have been rather clearly explained, there exists every justification and necessity for the participation by the federal government

in measures aimed at protection of the forest resources in all provinces. In the time which the Commission had to study the matter, we are not in a position to explain in detail the steps which should be taken. We may strongly urge, however, that the provision of funds from the federal treasury even for forestry work in the provinces, is quite in keeping with federal responsibilities, there is great need for federal aid to, and co-operation with the individual provinces, both in the solution of the fire problem, and in the control of forest insects and forest diseases. At this stage the Commission strongly commend the action recently taken by the federal government, in calling a conference of provincial ministers and forest officials for the discussion of fire protection problems. The extension of this idea is strongly urged, in order that the forest authorities throughout the country may recognize the inter-relation, as between the different provinces, of the forest fire problem.

Note:—The provision of more adequate facilities for fire protection is of paramount importance. Roads, trails, telephones, lookouts, air-craft, and numerous other works, are an essential requisite, and even at heavy immediate capital expenditure will quickly repay their cost in the timber saved by their use.

6. FOREST SURVEYS AND INVENTORIES

(a) That the federal government should enlarge its organization for the survey and inventory of the forest resources of Canada, and that it should co-operate fully with the provinces in providing, at as early a date as may be possible, much more reliable data regarding the extent of forest resources in various parts of the Dominion, than are now available.

(b) That within their boundaries the provinces should exert in greater intensity the function of forest surveys, and co-operate with the federal organization in the securing of preliminary forest inventories.

7. FOREST MANAGEMENT

(a) That the federal government, after the proper constitution of the forest service should thoroughly revise the legislation and methods in which timber is disposed of on lands subject to federal control, incorporating in such all those essential features of forestry which economic conditions may permit.

(b) That the provincial forest authorities should also take the action defined in (a).

(c) That owing to the great desirability of standardizing, so far as may be possible, regulations under which timber is disposed of, and to make provision for the proper study of the economics of taxation of timber lands, the federal government should make provision in its forest authority for a unit definitely organized for that purpose.

(d) That on federal forest reserves, such areas which now present opportunities for intensive management for sustained yield, should be immediately brought under measures to that end.

(e) That similar action be taken in the provinces for certain areas of lands already reserved, where economic conditions permit.

(f) That, on account of the fire hazard presented by woods' slash, some definite action must be taken to provide for the proper treatment of slash in logging operations.

8. TREE PLANTING AND WOODLOTS

(a) That the federal government continue and enlarge upon its present tree planting work in western Canada.

(b) That similar action be taken in the eastern provinces.

SESSIONAL PAPER No. 310

(c) That for both federal and provincial land there should be developed within the individual forest services units which would exercise the function of giving advice and help to farmers throughout the country in the management and treatment of their woodlots.

(d) That efforts in this direction should not be permitted to overshadow 9c, following.

9. SILVICULTURAL RESEARCH

(a) That the program of silvicultural research and growth studies now engaged in by the federal service, should be considerably enlarged upon, in order that more of the main problems underlying the development of proper forest management should be brought more quickly and generally to their proper solution.

(b) That forest authorities of the provinces should continue to co-operate with the federal service in silvicultural research work, and themselves engage in work of this character where the solution of purely local problems is essential to the development of proper plans for management.

(c) That forest experiment stations are urgently required throughout the Dominion, not only for the progress of silvicultural work, but also for the purpose of demonstrating to the people the objects and results of proper forest management.

10. FOREST EXPENDITURE

(a) That throughout the Dominion there be more thoroughly recognized, that in the protection and management of forest lands, a much larger part of the revenue extracted therefrom must be returned to the forest; that this is all-essential, even though other sources of revenue must be resorted to.

(b) That owing to the time element involved in all phases of forest practice, methods should be devised and applied whereby the forest services may be assured of continuous appropriations to cover at least those phases of their work which demand assurance and continuity in funds.

11. FORESTRY CONFERENCE

(a) That following upon the British Empire Forestry Conference held in Canada during 1923, and the conference of Dominion and provincial officials held in January last, there should, within a period of one year, be called a general conference to include, not only government representatives and forest officials, but also qualified representatives of the forest industries, or others interested in various phases of forest activities, for the purpose of discussing the ways and means for the improvement of methods in forest utilization and protection, and for determining the applicability of any measures which may be presented to such conference in the conduct of forest business.

PART III

THE QUESTION OF PULPWOOD EXPORTS

PRELIMINARY REMARKS

In Part I of the report we have dealt in detail with the pulpwood resources in various parts of the Dominion, and the extent to which such resources are subject to depletion through domestic use and export, and through fire, insects, and fungi. In Part II, the subject of Forest Conservation has been dealt with in considerable detail. There has been thoroughly portrayed the serious situation which exists in most parts of the Dominion, and the definite recommendations of the Commission urging remedial measures have been clearly set out. There still remains the economic question into which the Commission was instructed to enquire in order that they might lay bare the essential facts concerning the export of pulpwood from Canada,—to the end that the Government might be in a better position to determine a proper course of action, and to enunciate its policy regarding a question which has engaged widespread public attention during the past three or four years.

The complete terms of reference have been quoted in the Introduction to the Report; excerpts therefrom, which are basic to the following discussion are as follows:—

- (f) The question of the prohibition or restriction of the export of pulpwood from the Dominion;
- (g) Any other matter touching on the production, manufacture or sale of pulpwood essential to comprehensive consideration of the next preceding section (f).

While many different classes of people have interested themselves in the question, there are to be considered three main points of view. Firstly, we have the proponents of a complete embargo on the export of pulpwood, or of an export duty designed either to reduce the amount of wood annually exported or to prevent any further increases to a higher level in such exports. Secondly, the opponents of any restrictions in exports either by embargo or export duty. Naturally, both of these classes are divisible into various sub-classes, dependent upon the degree to which the individual may support or oppose restrictions. Thirdly, there is to be considered the national aspect of the problem, which, although it demands full consideration of the other two, must in the final analysis be the basis of decision.

There will be dealt with in the following pages the main arguments advanced by various interests. Except in the province of British Columbia there is at present no restriction in the export of wood from privately owned lands; we shall therefore treat first with arguments advanced by supporters of restrictive measures, and proceeding down the scale, as seems most appropriate, work toward the arguments of those most strongly opposed to restrictive measures. In doing so, reference will be made to exceptions which may occur in any class, and also, opportunity will be taken to express the views of the Commission upon the reliability of the evidence. In doing so, although statements must obviously be made in a spirit of candour, it is our earnest hope that they may be fair. It is in this spirit that the Commission has approached its task.

14-15 GEORGE V, A. 1924

The conditions under which pulpwood is exported from Canada have been dealt with in detail in Part I. That the present requirements may be kept clearly in view, a brief summary may be made. In Nova Scotia, there are no restrictions upon the export of timber cut from Crown Lands except in a large lease in Cape Breton Island where the operators are required to peel or ross the pulpwood. In New Brunswick, the regulations require that softwood timber cut from Crown Lands must be manufactured into pulp or lumber before being exported. In Quebec, Ontario and the Prairie Provinces, the regulations require that timber cut from Crown Lands must be manufactured before being exported. In British Columbia, the regulations provide that timber cut from Crown Lands must be manufactured before being exported, with the proviso that the exportation of surplus logs may be allowed under permission from the Government, upon advice of the Log Export Committee. As for private lands, in every province except British Columbia the timber owners enjoy unrestricted right of export. In British Columbia there is an arrangement under which timber cut from certain private lands is subjected to the payment of a manufacturing tax; if the timber is manufactured in Canada, the tax is almost entirely rebated, but if exported the tax stands. To this extent there is restriction in the export of privately owned timber in British Columbia.

SECTION A.—INDIVIDUAL OR ORGANIZED PRIVATE INTERESTS

1. PULP AND PAPER MANUFACTURERS

Through its Manager, the Canadian Pulp and Paper Association was officially represented at the public hearings. A comprehensive memorandum was read and filed with the Commission, this being supplemented later by a further statement; both of these statements are submitted herewith as Appendix I. They were submitted to establish three successive points:—

“First, that the rate of forest depletion is now dangerously high, in the sense of involving imminent and certain peril of a grave handicap to the Canadian pulp and paper industry and a marked increase of advantage to its competitors, not in a hundred years from now, not in fifty years from now, but in ten or fifteen years, or even less.

“Second, that the rate of depletion cannot effectively be reduced by any action that can economically be taken by the lessees of the Canadian pulpwood lands, or even by the private owners who possess in fee simple some small portion of the total amount of these lands. From this it follows without further argument that the stoppage of depletion must originate in government action, by the provincial or federal authorities or by both. This does not necessarily mean that the whole management of the conservation processes must be entrusted to government officials or to politicians.

“Third, that certain forms of action by both classes of government authority, which in the Association’s opinion are calculated to achieve the desired result, are perfectly within the powers of the respective governments, involve no hardships to any Canadian interest, and will work no injustice to any interest whatever.”

Basing its arguments upon the then most recent official figures for pulpwood resources and depletion, and after dealing with various phases of conservation, the Association’s statement leads to the conclusion that an embargo or other restriction is an essential step for the development of Canadian industry:—

SESSIONAL PAPER No. 310

(a) Citing the phenomenal development experienced by the industry as a result of "embargoes" placed by the provinces upon Crown land timber, by the imposition of requirements for domestic manufacture, it is claimed that an embargo upon private timber might be expected to further stimulate development of the industry in Canada.

(b) That although the amount of wood used by additional plants, presumed as a result of an embargo, would obviously not be saved, so far as use is concerned, it would take a considerable period of time for such industries to absorb the large quantity of wood now exported; that the amount saved in the interval would be a direct step in conserving of supplies; and that the general economic benefits of home manufacture would accrue.

(c) That notwithstanding such additional competition to existing industries, and even if this did not reduce actual consumption, it would in the long run react favourably upon forest conservation, the necessity of giving security to the gross capital invested furnishing the incentive toward conservation in timber supplies.

(d) That the process of logging without further manufacture is exhaustive, and offers no incentive to conservation of timber supplies; that pulpwood now cut and exported entails little capital investment; that the amount of wood now exported would support the investment of \$150,000,000 in mills producing 3,300 tons per day, employing over 8,000 operatives earning over \$11,000,000 in wages.

(e) That lacking this incentive, few of the American owners of pulpwood lands in this country exert effort toward conservation. This statement was modified verbally before the Commission.

(f) That the amount of pulpwood exports is increasing, and is over one-quarter of all the pulpwood cut in the Dominion.

(g) While no specific statement is made, the memorandum distinctly favours an embargo; failing that, as second measure, an export tax, the revenue from which, it is argued, should be expended in forest conservation.

(h) Failing both of the foregoing, that the embargo proposal be used as an instrument for negotiations aiming at reduction in duties imposed by the United States upon certain grades of paper exported from Canada. The attainment of this object, it is pointed out, would bring about development in the paper industry in Canada.

With regard to the foregoing arguments,—although restriction in exports would have some stimulating effect upon further development of the industry in Canada, the absolute amount of wood so restricted may not be taken as a gauge of such further development. In addition to wood supplies, there are to be considered the questions of power, and other economic factors. Under present conditions at least, much of the wood exported is from areas or districts where mills are not within easy reach, and in some regions there is at least some doubt that the general wood supplies and other contributing factors would justify the erection of mills. Setting aside other aspects of the matter, however, the experience already derived from provincial imposition of restrictions upon Crown land wood cannot be denied. The argument of the Association is, that while if such mills were to come in, it would serve the broader aspects of conservation, rather than merely forest conservation, yet that in so far as they did not come in, to that extent supplies would be conserved for future use in Canada.

Exception must be taken to that part of the Association's statement to the effect that American owners of timber lands do not participate in action toward conservation. As explained, this statement was qualified during the public hearings. It is well to add, however, that several such companies have spent and are spending considerable sums in forest protection, and in several cases they are going much further, with a view to continuous production.

As pointed out in Part I, although the ratio of exported wood to that used in Canada has over a fifteen-year period fallen from 63.3 per cent to 25.8 per cent, it is nevertheless the case that, even neglecting the unprecedented exports of 1923, the general trend in the absolute amount of exports is upward; also, the amount exported has always been greater than one-quarter of all pulpwood cut in Canada.

Regarding argument (h) it is to be noted that the third suggestion made by the Association, that is, the use of embargo proposals in negotiations for reduced tariff on paper products, is one, which if consummated would redound to financial advantage of Canadian mills, as today numerous mills are under severe handicaps owing to present American tariffs, and most of them would benefit greatly by reductions. In these circumstances, there is perhaps significance in the fact that the Association puts it in third place; that is, it should be used if export restrictions are inexpedient. It may be pointed out that although the creation of better market conditions, and resulting improvement in financial condition of the industry, might indirectly operate toward better forest conservation, by enabling the expenditure of greater funds in that direction, and also by encouraging the use of some species not presently used, obviously an increase in the drain on the pulpwood resources might be expected. Therefore, the economic applicability of the proposal must be premised upon a consideration of supplies available, rather than independently. Although the Association foresees the immediate advantages of the third proposal, therefore, first and second choices are accorded to restrictive proposals, which they infer more directly operate toward forest conservation.

The brief presented by the Association, although approved by the Executive, did not contain the views of all the pulp and paper manufacturers. In British Columbia, the pulp and paper manufacturers stated that they were not interested in an embargo, probably due to the fact that they have abundant wood supplies close at hand. In eastern Canada a few appeared who were opposed to any restriction in the export of privately owned wood, notwithstanding the fact that under restrictions they would probably be able to purchase their wood more cheaply. One prominent manufacturer took the ground (a) that it would be injurious to the interests of farmers and exporters; (b) that the province in which he is located had abundant wood supplies, indeed a surplus, regardless of future development of the industry; (c) that he was opposed to it by reason of the possibility of retaliatory tariffs on lumber and paper. As against this, it may be pointed out that in the province concerned the pulpwood supplies are relatively much more limited than in any part of the Dominion; this disposes of (b). In view of the fact that in the case of this manufacturer, the paper produced is newsprint, upon which there is considerable doubt that a retaliatory tariff would in any event be imposed, it may be inferred that the retaliatory tariff which he really fears is one on lumber: this is perhaps borne out by the fact that he is also a lumberman; in this behalf the discussion relates to a later section.

Another manufacturer was not anxious to see a restriction placed on the farmers. The wood in which he, for his own operations, is concerned however, is not of the species exported by farmers, and it may at least be inferred that present exports therefore have but little effect on supplies for his mill; indeed the taking out of one or two species, other than those required by him, might have the effect of cheapening the wood in which he is particularly interested.

Aside from the foregoing operators whose position may have been influenced by such other factors, there appeared before the Commission several operators or their representatives, the majority of whom favoured restriction of some sort, generally on the ground that the supplies should be conserved,

SESSIONAL PAPER No. 310

and that they were being subjected to unfair competition by the presence of American buyers. On the other hand, a few manufacturers were of the opinion that privately owned timber should not be subjected to restriction.

As against the claim of other interests, more particularly the farmers and pulpwood brokers, that they cannot in Canada find a favourable market for their wood, pulp manufacturers claim that they buy extensively from the farmers and settlers. The extent to which wood is so purchased by Canadian operators, as against that cut from their own limits, has been fully dealt with in Part I; in the Maritime Provinces, the amount purchased is about 50 per cent of total consumption; in Quebec, about 25 per cent; in Ontario, nearly 40 per cent; in British Columbia by reason of conditions previously explained, an insignificant amount is purchased from farmers or settlers. It is therefore manifest that there is a market in Canada, which is already taken advantage of, and which affords opportunities for extension. The Commission, however, is fully convinced that in many cases there has been a tendency, on the part of manufacturers, to pay wood-cutters the minimum price which would purchase the material,—and in itself that is perhaps human; in districts where American buyers are faced with high freight rates, Canadian operators may also be buying in the same market and at the same prices; in cases where the foreign buyer cannot offset the freight rate, the Canadian operator controls the market, and may reduce prices to the lowest point at which the settler will cut; finally, in areas more conveniently situated to the American market, the Canadian operator will frequently not compete. We feel that in cases where Canadian operators have been able to control the pulpwood prices, there has been a strong temptation to reduce pulpwood prices to the minimum.

While it is undoubtedly the case that many Canadian mills have difficulty in getting assurance of supplies by purchase—owing to the fact that settlers may hold out for higher prices from foreign buyers, and hesitate to engage in advance contracts with Canadian mills—it is strongly the view of the Commission that, in some cases, Canadian operators who advocate restrictive measures are not actuated solely by forest conservation; that they see in such measures the possibility of cheaper wood; and that, even under existing conditions, they certainly have not gone as far as they might have done in purchasing wood from those engaged in land-clearing operations. Undoubtedly there are some districts where the prices offered by American brokers render competition very difficult; yet in others, Canadian manufacturers have not perhaps taken advantage of opportunities for purchase which, if they were inherently actuated by forest conservation, they would have only too gladly seized. The fact must not be overlooked that many pulp mills are faced with embarrassing financial conditions; it has been stated that fourteen such companies are in receivers' hands. While it might be advanced that with wood at the prices which they have to pay, either in cutting themselves or by purchase, they find it difficult to withstand the competition for raw materials which prevails—the Commission strongly doubts that the prices paid for wood by mills in Canada has been the serious factor in causing their difficulties; rather, these difficulties are primarily the result of other factors.

One feature which has operated to restrict local purchase from settlers, during the past few years, has been that the large operators have been carrying on extensive cuttings to salvage fire-killed and insect-infested wood; the pulpwood market has, therefore, been flooded; indeed, instances have occurred where large amounts of wood, for which there was no sale either in Canada or the United States, have been left to rot—a dead loss in wood-value, and also in the work performed.

Other arguments are advanced by the Association regarding the constitutionality of an embargo measure. Inasmuch as the government of Canada has already passed an Act permitting the imposition of an embargo by Order in Council, it may with propriety be assumed that the question of constitutionality has been fully considered by the government's legal advisers, and no reference to that phase of the question is required of the Commission.

didn't find a fool in this crowd
2. PRIVATE INDIVIDUALS

A limited number of people appeared before the Commission who, while not directly interested in the problem, took the position that on the broad grounds of economies and conservation, the imposition of restrictions is desirable. Although he did not appear before the Commission, typifying this class—if his claims to lack of personal benefits from restrictive measures be correct—is Mr. Frank J. D. Barnjum, for several years past the outstanding advocate of the embargo. The Commission was most anxious to have Mr. Barnjum appear so that he might give at first hand the benefits of his wide experience and detailed study of the problem. Although cordially requested to appear, and having indicated that he would do so, he later declined. While the Commission entertains great admiration and respect for Mr. Barnjum, in so far as patriotic motives may actuate him in the devotion of his time and means to the cause of forest conservation, the view is expressed that any person who of his own volition undertakes the responsibility involved in a campaign to mould public opinion, highly-motivated though his efforts may be, also bears the responsibility to justify the stand which he may take upon a great public question. Merely as a statement of fact, the Commission records the further view, that if Mr. Barnjum had appeared before the Commission and if his cause, and his methods and arguments are well-founded—he would have thoroughly justified himself before the Canadian people, and a much clearer conception of the problems of forest conservation would thereby have become instilled in the public mind.

Numerous private individuals in advocacy of restrictions, have at times resorted to the use of generalized statements that have no foundation in fact, they argue that there is but "ten years" supply of pulpwood; that "fires, insects, etc., destroy ten, twelve, or more times the amount of wood actually utilized", and other statements. In fact, Mr. Barnjum's statements, more than those of any other individual, savour of extremes of this character. The futility and danger of such statements have been explained elsewhere. Faced with the argument that if an embargo were imposed, many farmers would not have a market for their wood,—the claim is made that new mills would be constructed; when it is pointed out that this will not contribute to forest conservation,—the substitute position is adopted that conditions are so serious that the governments must curtail the cut from Crown lands, and by this means create a demand for privately owned wood that now crosses the American border.

If there be weaknesses in the trend of arguments advanced by such exponents, they lie more in misconception as to the actual forest conditions. The forest situation in Canada is quite serious enough to demand the imposition of any conservation measures which may be practicable, without exaggeration or distortion of facts. It cannot be denied that the broad economic principles of conservation are better served in home-manufacture of raw-materials; it cannot be denied that the restriction of exports encourages development of Canadian industry—experience has already proved it; but to the whole problem the most careful thought must be given, and the action taken must be premised upon the economic requirements arising out of the condition of our forest supplies—the latter dictates a candid treatment of facts regarding the forest resources, which facts are frequently not in possession of those who undertake solution of the problem.

3. FORESTRY EXPERTS

It may at the outset be stated that the foresters in Canada are more actively engaged upon the broad work of forest conservation. Recognizing that the question of pulpwood exports is in a considerable measure an economic one; recognizing also, that in so far as forest conservation is concerned, the main problem lies in the regeneration, protection and proper utilization of the timber stands, they have not as a class permitted themselves to be diverted from these purposes; and, except in certain regions, they have not been very active in the expressions of their opinion, one way or the other, upon the pulpwood export problem. In some cases also, this may be attributed to the feeling that their opinion would be considered to be biased.

In Nova Scotia no foresters appeared before the Commission, and consequently no views were expressed by such men as having application to the conditions in that province. In New Brunswick the Provincial Forester appeared before the Commission, but by virtue of his position, he refrained from taking a definite stand on the pulpwood export issue. He has, however, advised the Commission; he has thoroughly indicated in his departmental reports; and finally, there is to be thoroughly inferred from the statistics presented by him to the Commission; that in New Brunswick, a very serious situation exists. Not only has widespread havoc been wrought by fires and insects, but there is serious over-cutting in the soft-wood species. In a publication of the Department, he clearly states that, in addition to public lands, the farm woodlots of New Brunswick have been seriously over-cut in recent years.

In Quebec, neither the Provincial Forester nor his Assistant took a definite stand upon the export issue, but the Chief Forester plainly pointed out that the private timber-lands in the Province of Quebec are being subject to the depletion at a rate which they cannot possibly sustain. He was of the opinion that local pulp companies could and should take greater advantage of the opportunities which offer for the purchase of timber cut from private lands. The Assistant Forester, during examination by the Commission, expressed the view that, even with the continuance of fire and insect losses on their present scale, there is an annual increment in the forests of Quebec sufficient to offset those losses, and also to provide for about one-half the amount annually used as pulpwood. Upon thorough review of his evidence the Commission has ample ground for the belief that he erred on the side of optimism.

There also appeared before the Commission, in Quebec, two or three professional foresters, who represented the Quebec Society of Forest Engineers. This body definitely took the stand that forest conditions in the province are such as to demand restrictions in the export of pulpwood. Still other foresters, and persons having an intimate knowledge of forest conditions, appeared before the Commission and gave evidence indicating that, while the situation by no means is so serious as is portrayed by the extreme advocates of restrictions, the supplies available at the present rate of depletion could be expected to last for not more than 20, 25 or 30 years. The evidence of these men also has been subjected to careful analysis and it is the opinion of the Commission that they, on the other hand, may have erred on the side of pessimism.

In Ontario, very few foresters appeared before the Commission. The Chief Forester of the province refrained from expression of opinions on the export issue, but he collaborated with the Commission very thoroughly in consideration of the extent of supplies, and emphasized the importance of conservation measures. Another professional forester appearing before the Commission was an American engaged in the pulpwood brokerage business, acting as a buyer for American Pulp and Paper Companies. He emphasized the need of conservation in other directions, as opposed to conservation by restriction on exports.

Still another forester who appeared is a federal official engaged in railway fire protection work; by virtue of his position he refrained from an expression of opinion on the export issue and emphasized the other important requirements of forestry.

In the Prairie Provinces three officials of the Federal Service appeared, and although refraining from expressions on the pulpwood export issue (it does not in any case affect the Prairie Provinces very much) nevertheless emphasized the need for conservation in other directions. In British Columbia, where timber conditions are entirely different, and where the organization of the timber business is on an essentially different basis, the Chief Forester, while not clearly expressing his view on the Embargo, inferentially indicated that, so far as log-exports were concerned, the methods of restrictions now applied in that province adequately serve the situation there.

Generally for the Dominion, it will be seen that many foresters have necessarily refrained from offering opinions on the export question, but they all strongly urged the necessity of applying proper conservation methods.

4. BOARDS OF TRADE

The attitude of bodies of this character has to a greater extent been determined by their location. Upon the basis of their knowledge of the situation, it is undoubtedly the case that the majority opinion of these bodies, throughout the Dominion, would be in favour of restriction either by embargo or export tax. There are, however, so many of them that would not themselves be directly affected by such restrictions; they recognize in home-manufacture the broad principle of industrial conservation, which they consider should be applied in the fullest possible degree. Other organizations, however, situated in districts where they are in close contact with the wood-cutters and forest industries, have in many cases voiced strong objections to restrictions in export. On the other hand, even in timber districts, some such organizations have come out very strongly as supporting restriction in the export of unmanufactured pulpwood. Although it must be admitted that, of the foregoing, those organizations more closely in contact with actual wood-cutting operations have a more intimate knowledge of the concrete problem of pulpwood exports,—and their views must consequently be given most careful consideration—it must also be conceded that other organizations of similar character, but without direct interest in pulpwood operations, are fully entitled to an expression of their views on a problem which assumes national importance.

Such organizations have pointed out that, under the present system permitting pulpwood exports, development of the industry in this country is curtailed; that many young men cross the boundary to the United States, where they secure employment in American Pulp Mills; and that they there engage in the manufacture of the finished product of Canadian raw materials. They point out that were such wood manufactured in Canada it would not only serve to retard emigration of this sort, but that it would result in production values from three to ten times the amount now received in Canada from pulpwood which is cut for export. They refer also to the previous immigration of industry which resulted from the imposition by governments of restriction on the export of Crown land timber; they urge that so long as United States pulp mills are able to secure raw wood from Canada, it cannot be expected—with their large investments in partly immovable plants—that they will establish industries in Canada; and that our cheaper wood supplies, better power facilities, and such factors, would, in the event of restrictions upon the export of raw wood, encourage them to come over here.

With the foregoing arguments, it is not at the present moment necessary for the Commission to enter into details of discussion, inasmuch as the points

brought out are in any case dealt with elsewhere. It may, however, be stated that the attitude of those public organizations, which are not in direct contact with timber operations, and which have been more or less influenced by propaganda favouring restrictions, epitomizes the view of that part of the Canadian public which does not come into direct contact with forest utilization; in a much more limited way, it characterizes the viewpoint of some people who are in direct contact, but who have inherent objections to permitting raw materials to be exported.

5. LUMBERMEN

For discussion, this class may be divided into 3 main groups; (a) those lumbermen in Eastern Canada or on the Prairies who engage in no way in pulpwood operations or pulp manufacture; (b) lumbermen in Eastern Canada, who in addition to taking out and manufacturing saw-logs, are also interested in the pulpwood business, and in some cases in pulp-manufacture; (c) lumbermen in British Columbia where, on the Coast at least, the logging and the manufacturing phases are distinct, and where there exist certain conditions respecting the export of logs, which lead them to take a decided view one way or the other on an embargo or other restriction in exports of unmanufactured wood.

(a) EASTERN LUMBERMEN EXCLUSIVELY ENGAGED IN TAKING OUT AND MANUFACTURING SAW-TIMBER

During the course of the public hearings it was only in the provinces of New Brunswick and Nova Scotia that lumbermen of this class participated very definitely in the enquiry. In most instances those who appeared were opposed to restrictions in the export of pulpwood. In Quebec and Ontario, no great interest was exhibited by this class on the question of export restrictions; in fact, many preferred not to express their views on the subject and confined themselves to other phases of conservation. In the Prairie Provinces several lumbermen appeared before the Commission, but only in Manitoba—to which province the pulpwood business of the prairies is confined—did any lumberman express his view on the subject; in that case the gentleman inferentially favoured restrictions in export in order to encourage home industries, premising his view, however, upon the establishment of a pulp mill in Manitoba; otherwise, he saw no reason to curtail the settlers' market. In both New Brunswick and Nova Scotia, particularly the latter, timber lands are in a greater extent held in fee simple, and as explained elsewhere the timber resources in these provinces have been rather severely exploited. Numerous lumbermen, therefore, hold considerable tracts of land which, although under forest cover, over considerable areas contain little timber which is exploitable as lumber at the present time, but which has nevertheless a definite value as pulpwood. The interest of lumbermen in the latter category, therefore, lies in protecting the sale value of their timber lands, by leaving unrestricted the market for pulpwood which might be cut therefrom.

(b) LUMBERMEN INTERESTED ALSO IN PULPWOOD

Very naturally, where a lumberman's interests overlap the pulpwood industry, his opinions on the export issue are in considerable measure governed by his interests as a pulpwood holder, and he is desirous of retaining as wide a market as possible for that product. Objections based upon the lumbering end of the business have also been voiced, and will be dealt with in due course. Most lumbermen who engage in both pursuits, however, take strong exception to restriction of exports.

(c) BRITISH COLUMBIA LUMBERMEN

The loggers in this province object to federal export restrictions by reason of their claim that such action would curtail their market for low-grade logs which they claim local manufacturers cannot use. On the other hand, British Columbia lumber manufacturers as a class oppose the restrictions, claiming that the sale of low-grade logs by export is necessary, as it makes possible the more reasonable purchase of the better grades which they require for manufacture of products which they can market. Conditions applying to the logging industry in British Columbia have been fully described in Part I, so that at the present juncture no further reference is necessary, other than to state that although all of the loggers, and the great majority of the manufacturers, who appeared were opposed to restrictions—other than those which are now applied by the province—there were one or two instances in which very prominent manufacturers thoroughly supported restriction of exports. The latter, however, were interested in the purchase of logs.

(d) GENERAL

For those lumbermen, whose objections to restrictions apply exclusively to the lumbering business proper, it may be stated that their objection is based on the premises that if Canada imposes an embargo or export tax upon pulpwood, they may be subjected to retaliatory tariffs imposed by the United States upon lumber or allied products of saw-mills. Before dealing with the situation there may be quoted two sections of the Fordney Tariff, which have application:—

"Item 1700: United States Import Duty Tariff Act of 1922.

"Wood: Logs; timber, round, unmanufactured, hewn, sided or squared otherwise than by sawing; pulpwoods; round timber used for spars or in building wharves; firewood, handle bolts, shingle bolts; and gun blocks for gunstocks, rough hewn or sawed or planed on one side; sawed boards, planks, deals, and other lumber, not further manufactured than sawed, planed, and tongued and grooved; clapboards, laths, ship timber; all of the foregoing not specially provided for: Provided, That if there is imported into the United States any of the foregoing lumber, planed on one or more sides and tongued and grooved, manufactured in or exported from any country, dependency, province, or other subdivision of government which imposes a duty upon such lumber exported from the United States, the President may enter into negotiations with such country, dependency, province, or other subdivision of government to secure the removal of such duty, and if such duty is not removed he may by proclamation declare such failure of negotiations, and in such proclamation shall state the facts upon which his action is taken together with the rates imposed, and make declaration that like and equal rates shall be forthwith imposed as hereinafter provided; whereupon, and until such duty is removed, there shall be levied, collected, and paid upon such lumber, when imported directly or indirectly from such country, dependency, province, or other subdivision of government, a duty equal to the duty imposed by such country, dependency, province, or other subdivision of government upon such lumber imported from the United States.

"Item 1301:

"Printing paper, not specially provided for, one-fourth of 1 cent per pound and 10 per centum ad valorem: Provided, That if any country, dependency, province, or other subdivision of government shall

SESSIONAL PAPER No. 310

forbid or restrict in any way the exportation of (whether by law, order, regulation, contractual relation, or otherwise, directly or indirectly) or impose any export duty, export license fee, or other export charge of any kind whatsoever (whether in the form of additional charge or license fee or otherwise) upon printing paper, wood pulp, or wood for use in the manufacture of wood pulp, the President may enter into negotiations with such country, dependency, province, or other subdivision of government to secure the removal of such prohibition, restriction, export duty, or other export charge, and if it is not removed he may, by proclamation declare such failure of negotiations, setting forth the facts. Thereupon, and until such prohibition, restriction, export duty, or other export charge is removed, there shall be imposed upon printing paper provided for in this paragraph, when imported either directly or indirectly from such country, dependency, province, or other subdivision of government, an additional duty of 10 per centum ad valorem and in addition thereto an amount equal to the highest export duty or other export charge imposed by such country, dependency, province, or other subdivision of government, upon either an equal amount of printing paper or an amount of wood pulp or wood for use in the manufacture of wood pulp necessary to manufacture such printing paper."

With regard to Item 1700, above quoted, it should be pointed out that it has no direct relation to any action which Canada might take in restricting by embargo or other means the export of pulpwood from Canada. What the Item *does* do, is to make provision for the imposition of the United States tariff on Canadian timber products, if, and when, the Canadian Government imposes such *import* duties upon similar products coming from the United States into Canada. In other words, the Item of itself has no relation to export restrictions and cannot be construed as a true basis for retaliatory action. The real reason for which Item 1700 has been applied by lumbermen as an objection to export restrictions, is that under the present Canadian tariff there already exists an import duty upon certain classes of lumber; in other words, the provocation for effective application of Item 1700 of the United States Tariff now exists. In the premises, it has been argued that if Canada were to impose restrictions on the export of pulpwood, the United States could take advantage of the situation above referred to; and on these grounds it is claimed that restrictions on pulpwood exports might constitute a *further* provocation which might result in application by the United States of import duties on Canadian lumber now entering the United States free of duty.

While such a construction can be forced upon the present situation, it need only be pointed out that the directly provocative tariff which now exists is maintained with full acquiescence of lumbering interests, if indeed, it was not imposed directly at their request. If, therefore, there exists any need for restriction in pulpwood exports, either for the conservation of Canadian pulpwood supplies, or even for the protection of the Canadian pulp and paper industry, it is illogical to argue that the real provocation lies in action to that end.

In so far as lumbermen in various parts of Canada object to restrictions upon the export of pulpwood on the basis of possible retaliation, such objections must necessarily be founded on Item 1700. Whether it be in the Maritime Provinces, in Quebec, Ontario, or in British Columbia, this is the basis of the fears which are entertained. Enjoying as they do free access to United States markets for so many of their products; enjoying, also, such benefits as may accrue through Canadian import duties on similar products, imposed for their protection from foreign competition; those who are exclusively lumbermen—and who do object—take the position that it is inimical to their interests, if, in some

14-15 GEORGE V, A. 1924

other direction—and applying to a product in which they claim no vital direct interest—action be taken by the Government to apply restrictions which—dependent upon insufficiency or sufficiency of supplies—may or may not be necessary.

Item 1301, on the other hand, is the one which applies directly to the question under consideration, and any consideration of the prospects of retaliation, in the event of restrictions in pulpwood exports, should manifestly be based upon it. It provides that in the event of Canada imposing restrictions on pulpwood exports, the President of the United States may—in event of failure to obtain relief under a clearly defined procedure—impose a retaliatory super-duty upon printing paper, which product is already fairly well protected by that country. The application of this item is to a product of pulpwood. Although undoubtedly some operators may fear retaliation even under this clause, it is clearly the case that the Pulp and Paper Association as a body take the stand that the question of restrictions must be decided on what they consider to be much more important grounds.

Reference may be made to a condition existing in British Columbia. Notwithstanding the fact that the lumber industry of that province operates under the same protection tariff as do lumbermen elsewhere in Canada, and notwithstanding the provocation which may therein lie by virtue of Item 1700 of the United States Tariff, the province of British Columbia has for many years applied its “manufacturing tax” to timber from private lands, which tax operates in restriction of exports of privately owned timber. Therefore, in addition to provision for domestic manufacture of Crown land timber—except where special permits for exports are granted—the province itself restricts exports on private timber. More detailed reference is made to this matter in Part I, and a brief reference to its operation will suffice here. During the past five years 74 per cent of total log exports for both lumber and pulp have been from private lands held under various forms of Crown grant. For all private timber which is subject to the manufacturing tax, operators must pay \$2, \$1.50 and \$1 per thousand feet, on No. 1, No. 2, and No. 3 logs, respectively. If, however, the timber be manufactured within the province all but one cent per thousand of this tax is refunded. Under the timber conditions existing in the province of British Columbia, it may hardly be claimed that this tax is enforced for the purpose of conserving timber supplies. Obviously, it was applied to encourage and develop home manufacture; indeed, protection to British Columbia lumber manufacturers may have influenced its introduction.

As this is the only restrictive measure now applied in Canada to exports of privately owned timber, reference to Item 1700 clearly indicates that its existence may have been the motive for the careful wording of that tariff provision. In British Columbia, therefore, there is the additional provocation. While the majority of loggers and lumber manufacturers in the province have given evidence of the strong objection to federal measures operating to restrict pulpwood exports, it is nevertheless the case that they are themselves operating under one directly applied by the province, which applies to logs for all purposes. It is therefore evident that, except in so far as a federal tax might increase the burden on a trifling part of the log-exports, the operators in that province cannot logically object to the principle of such restriction.

Obviously, in determining a question of this kind, the government is called upon to carefully weigh the prospects of retaliatory action, but in so doing it is only proper that the true meaning and application of provisions of the United States Tariff should be studied, and, in so far as they may affect a decision, such action should be based upon their actual portent. It may here be pointed out that on various occasions the possibility of retaliation in other

SESSIONAL PAPER No. 310

directions—by the application of a United States embargo on coal, for instance—has been advanced as an objection to pulpwood export restrictions. Manifestly, such a question has to do with trade relations between the two countries; as it is beyond the scope of the Commission to engage itself with studies which are foreign to its terms of reference, and as a discussion offered without such detailed study would certainly be of little value, the question of such a form of retaliation will not receive further treatment.

Another feature of the British Columbia situation requires explanation. It is claimed that conditions there would prevent the successful application of federal restrictions upon the pulpwood export. The difficulty offered, lies in the fact that logs which are exported may be used either for lumber manufacture or in the production of pulp. With this as a reason it is claimed that federal restriction in pulpwood export would prevent the continuance of the present practice of exporting low-grade logs, and thereby be seriously injurious to the interests of the loggers, the manufacturers, and to the economic development of the industry generally in British Columbia. If an embargo, or any other restriction which might be imposed, were so designed that it would prevent the export of all logs from British Columbia, it might be conceded that their interests would suffer. As will be pointed out later, however, if it is otherwise found necessary to impose federal restriction upon pulpwood exports, it is assuredly a simple matter to do so without in any serious degree affecting the interests of the British Columbia loggers or lumber manufacturers.

6. FARMERS AND SETTLERS

To obtain a clear conception of the problem as it affects this class, it is necessary to divide the farmers and settlers into three groups, (a) the individual who takes up land under the guise of settlement, but really for the purpose of cutting and selling timber; (b) the settler who is clearing his land for the purpose of bringing it under cultivation, and (c) the established farmer who, having a woodlot, may desire to reap some benefit from it other than by simply supplying his domestic requirements of wood.

(a) THE BOGUS SETTLER

As has been fully explained elsewhere, it is unfortunately the case that in various parts of Canada, through laxity of settlement laws or through inefficiency in application of them, large numbers of so-called settlers have been permitted to take up land, which after they have successfully stripped it of timber has been abandoned. There is little need for discussion of this class further than to say, that no matter how proficient he may be in the art of cutting timber and disposing of it, as long as that is his main object in life, he is not the type of citizen required in any phase of Canadian activity, other than in the shanties where his efforts may be used in the proper direction. This type of settler adds little to any community, for the reason that his operations are destructive, and the very practice he follows necessitates his frequent removal from one part of the country to another. The Commission has already strongly urged that thorough control should be exercised to prevent continuation of the practice of allowing these people to secure land. It is evident that the class, as a whole, may be eliminated from any consideration in so far as the question of restrictions upon the export of pulpwood is concerned.

(b) SETTLERS CLEANING LAND

In contradistinction to the bogus settlers discussed above, individuals in this class are worthy of the most serious consideration and sympathy. The time is nearly gone in Canada, when an intending settler may go out and select

14-15 GEORGE V, A. 1924

a piece of open agricultural land under any one of the various homestead laws and establish a home for himself. Indeed, it is now generally the case that he must be content with land which is in greater or lesser degree wooded. To give proper consideration to this class, it is necessary to refer to the fundamental considerations set out in Part II of the report, namely: that so long as the land is agricultural, there is no object to be served in preventing the utilization of timber which may be upon it. Providing that the timber is merchantable or near-merchantable, an effort must be made to dispose of it advantageously with the greatest possible speed. It is, therefore, desirable that this class of settler should enjoy a market which will permit of his disposing of his wood as advantageously as circumstances may permit. It must be remembered, however, that while it is quite proper to concede that, during the operations of land-clearing the timber should furnish subsistence for the settler, it is not to be inferred that having taken up free, or practically free, land, he is entitled to any great consideration by way of stumpage. His purpose is to get the land clear, and if in so doing, he be adequately reimbursed for the labour he may give, he is not, after all, inherently entitled to anything more. As a matter of fact, more frequently the homestead is not his until he has an appreciable part of it cleared. When he does secure patent, the position of the matter assumes a different aspect. Whatever the market may be, however, he is entitled to fair wages.

(c) THE FARM WOODLOT

In the case of the farmers established on lands under agricultural production and having woodlots which they desire to operate on a continuously productive basis, some appreciable value must be attributed to stumpage. More frequently such lands are located in the older parts of the provinces, and in many instances the farms have been handed down from generation to generation. In view of their more advantageous location in close proximity to pulpwood markets, such men have an inherent right to something more than mere compensation for the labour involved in the removing of timber.

With these three classes in view we dismiss from further consideration the bogus settler. For the others, we have in Canada innumerable instances of the great variation in degree and value of timber holdings, determined by the existence of markets. In Southern Quebec there are established farmers who receive \$14, \$15, or even \$16 per cord for wood that it may cost \$7 or \$8 to cut and peel. On the other hand in the clay belt region there are large numbers of settlers who must put their pulpwood on the railway sidings at \$4.50, \$5, or \$6 per cord. In the former case, the farmer is receiving a very high return for his stumpage; in the latter the stumpage does not bring anything.

Inasmuch as the proportion of farmers' wood represents 60 to 65 per cent of all the pulpwood exported from Canada, it is of great importance that careful consideration be given to their views. It may be stated that to a far greater extent, farmers directly interested in the pulpwood business have expressed opposition to the imposition of restrictions either by embargo or through an export tax. By reason of the fact, however, that there was a great similarity in the character of the evidence presented by farmers as a class; in view of the fact that, to the knowledge of the Commission, other classes such as pulpwood exporters, were very active in bringing about the appearance of farmers before the Commission, and in securing petitions from them which were presented to the Commission, it can hardly be claimed that the views presented to the Commission by this class were offered entirely of their own volition. However, farmers have not perhaps the same opportunity for organization of their interests as have other classes; therefore, beyond expressing the view that many farmers

SESSIONAL PAPER No. 310

have been influenced to oppose restrictive measures by these other classes, and may even have been furnished with arguments to that end, the Commission has no serious criticism to offer to the procedure that was adopted.

The objections of the farmers and settlers, as a class, to restriction in pulpwood exports are as follows:—

(i) They desire the widest possible market.

(ii) It is claimed that in some cases an embargo would prevent access to any market; in other cases, that they would be forced to accept a lower price for their wood from Canadian pulp mills.

(iii) That an export tax would operate in the same direction as (ii) and if imposed, it is the settler and farmer himself who would be called upon to pay the tax.

(iv) That where the American market is the only one to which they have access at present, the restriction of export would not bring about the establishment of mills accessible to them, as they claim that the aggregate of timber supplies in their district is not sufficient to sustain a mill.

(v) That the Canadian pulp mills have taken serious advantage of settlers who through circumstances have not been directly accessible to the American market; that therefore they have not received a proper price for their wood.

(vi) In many instances, they claim to have offered wood to the local pulp mills at reasonable prices, but have been refused.

(vii) That for the reasons explained in (vi), if restrictions be imposed, the Canadian mills would take undue advantage of them, by reason of the cessation or restriction in the profitableness, of the American market.

(viii) That by reason of their control of licensed or private timber lands, the Canadian pulp mills have a leverage over the farmers and settlers, in that if for any reason the mills desire to depreciate the price asked by farmers, they may simply refuse to buy, securing the necessary timber from their own limits, and await the time when the farmer of necessity reduces his price.

(ix) That a large number of farmers engage in cutting poplar, for which species there is practically no market in Canada either in pulp manufacture or in any other industry; that if restrictions be applied such farmers would be excluded from any market or else would find their present market curtailed.

(x) That farmers engage in cutting fire-killed and insect-infested timber; that Canadian mills cannot absorb all of this material.

(xi) That in certain districts the cutting of timber on the farm provides the settler with the main means of subsistence.

Throughout the country, there is wide variation in the amount considered by the farmer to be a fair price for his wood. In some parts of Nova Scotia, they take out wood at \$5 or \$6 a cord, and feel that they should have a little more. In parts of New Brunswick many farmers secure \$10 a cord for peeled spruce pulpwood; here, too, they feel that they are not being adequately paid; indeed, some claim that \$10 per cord does not more than pay for the labour. In southern Quebec, as previously intimated, farmers may be receiving \$15 or \$16 per cord; they claim that a reduction in this price would leave them very little for stumpage, although they may be receiving \$6 or \$7 for it. In parts of northern Ontario \$5 or \$6 is all that can be secured, and in Manitoba similar prices prevail. Finally, in British Columbia—where wage rates are generally higher than in other parts of the Dominion—the farmers take out pulpwood in the Fraser Valley for \$5.50 or \$6 per cord. As is the case in almost every line of human activity, therefore, the price received is not quite sufficient to satisfy. In some cases the farmers' claims are more reasonable; in other cases they are extreme on the question of price.

There is no doubt that the curtailment of markets, by restriction upon the export of pulpwood, would inevitably have considerable effect on the extent

to which the farmers of some districts could engage in pulpwood cutting; also, it might definitely be expected that under such restrictions there would be a stabilizing in pulpwood prices, which in some cases would reduce the amount below that now received—a tendency to reduce the price closer to the labour-cost of cutting. As previously stated, the Commission is of the opinion that, in the past, at least some Canadian operators have cut pulpwood prices to the bone. There are some companies that do pay, and perhaps others that could be convinced of the desirability of paying settlers fair prices for their wood; but it may be fully expected that, in some other instances, there are those who, enjoying freedom from competition in the purchase of their wood, would continue to take advantage of the situation. Aside from price-fixing by the governments, or other measures of that character—which are just as difficult of application here, as in any other direction—the only apparent way in which such difficulties could be overcome would be through organization of the settlers of a district to demand their just rights.

On the question of stumpage, it may be stated that the very reason for which pulpwood prices are lower in more northerly districts, is the same reason for which established pulp industries cannot afford to pay as much for their wood as those located further south—namely, transportation costs. It must be remembered that, in addition to paying freight upon finished products shipped from their mills, companies located at such distance also have to pay heavy freight charges upon materials essential to the operation of their mills which must be railed in from distant points. Although it has been mentioned that a homesteader on timber-land may have no inherent right to much for stumpage, it is just as true that the pulp manufacturer has no inherent right to that stumpage. The settler engaged in clearing operations on land to which he is in the process of earning title is fully entitled to equitable wages for the labour he performs—preferably a little more than that; also, the man on a well-established farm is, in addition to the labour value in pulpwood, entitled to reasonable compensation for stumpage, depending on his location; but for that type of farmer who considers that, even on land of which he has been possessed for many years, the timber supplies must provide the major part of his subsistence—and by reason of this, that he must be paid exorbitant rates of stumpage—it is not necessary to extend the same sympathy. If a thoroughly established farm cannot provide the major part of sustenance of the owner and his family in the value of agricultural crops, there is something radically wrong with the land itself, or with the region in which he has undertaken farming operations. In such instances, it is futile to blame the pulp industry, or to condemn the pulpwood markets, simply because they cannot offer the price for wood which such a farmer may consider necessary to provide the greater part of his subsistence.

In some parts of eastern Canada it was claimed that many farmers in handling their woodlots are definitely applying the methods of cropping their timber, and great stress was laid upon the fact that, in so far as they might be deprived of markets, there would result an economic loss through failure to take advantage of the growth of which such woodlots are capable. Although there may be some cases where the woodlots are receiving proper treatment, the picture drawn, that farmers generally in any region were following this practice, is decidedly over-coloured. In some cases, the practice of selective cutting is followed, but nowhere is consistent treatment of the woodlots over a whole district. In the majority of cases, the amount of wood cut from an area depends upon the price which the farmer can receive for the wood at the particular time, and the amount of labour which he is in a position to apply to its removal.

SESSIONAL PAPER No. 310

The Commission has been unable to determine closely the number of farmers who might be affected by any restrictive legislation. It may, however, be stated that it probably runs between 25,000 and 50,000. It is only those farmers who would be directly affected by such legislation that have appeared before the Commission, and it cannot, therefore, be inferred that farmers as a class throughout Canada are opposed to restriction in the export of pulpwood. For those that would not be affected by such legislation, it may be assumed that there is a feeling that the home-manufacture of raw materials is desirable. Many farmers intimated that they were perfectly willing to submit to restrictions in export, if they could be assured of markets and fair prices—they nearly all admit the desirability of home manufacture—but relatively only a small part of those affected appear to have confidence that the pulp companies may be depended upon to provide such protection for them. Indeed, the Commission is of the opinion that such objects could be attained only through the application of restrictive control by governments over other sources of wood supply now drawn upon at will by the manufacturers.

7. TIMBER-LAND OWNERS

The general argument of timber-land owners lies in the depreciation of the timber-land values which they claim will result from the imposition of an embargo or tax on pulpwood exports. This phase of the situation was touched upon in dealing with those lumbermen in the Maritime Provinces who own timber-lands which are essentially valuable for pulpwood. Elsewhere, however, the same argument is applied in greater or lesser degree. Such people also claim that restrictions would discourage the influx of foreign capital. In addition to the foregoing, many other arguments which already have been treated of, are advanced.

Particular attention must be given, however, to the timber-lands held in fee simple by foreign companies who engage in the cutting of timber to feed pulp manufacturing establishments in the United States. The arguments advanced by these American owners are set out in a brief, submitted by their Counsel, and attached hereto as Appendix No. 2. After setting out the various advantages under which Canada now operates in enjoyment of American markets for the various classes of wood products, the brief goes on to explain the origin of pulpwood imported from Canada into the United States. Basing deductions partly on Canadian statistics, and partly on replies to questionnaires circulated among American pulp manufacturers; referring also to a statement which was made in the Canadian House of Commons at the time of the amendment to the Export Act providing for restrictions on pulpwood; the brief reaches the conclusion that under an embargo, only an additional 1.7 per cent of the total pulpwood cut in Canada would be retained in this country for the use of Canadian mills. Referring further, to the Order in Council of August 14th, 1923, which made provision for the exemption of contracts already entered into, the final conclusion is reached that not more than one per cent of the pulpwood cut, would, by embargo measures, be retained in Canada. On this basis it is argued that the embargo proposal would be futile as a conservation measure.

Citing authorities on the requirements as to developments in pulp manufacture, the brief proceeds to demonstrate that mills will be established in Canada only when business conditions warrant, the inference being that the embargo would have little effect in bringing that about. In amplification of this statement, they point out that United States still has large supplies of timber which can be drawn upon, and in this manner migration of further United States industries to Canada will, even in event of an embargo, owing to the extent of domestic supplies, be restricted.

After this general argument to the effect that Canada will reap no advantage from an embargo upon pulpwood exports, the cases of several individual American pulp and paper companies who own extensive tracts of timber in Canada, which they operate and export the wood therefrom to the United States, are described in detail. It is pointed out that large investments have been made in good faith, and that, further, large sums have been expended in the development of the properties on the complete understanding that export would be permitted; that the prevention of exports would be a breach of good faith, and not only operate seriously to the disadvantage of these companies, but will disturb Canada's credit as a place of security for foreign investment.

So far as the brief submitted by the Counsel for American pulp and paper companies is concerned, attention is entirely confined to discussion of the embargo. Although these foreign owners have at various times argued against imposition of an export tax, their main case is directed against embargo. In a very dignified way, they admit the right of the Government to impose restrictions—except in cases where they consider such action would directly violate agreements entered into between the Government of Nova Scotia and American timber holders—but argue that the embargo is not in the public interest.

Obviously in a case where the imposition of an embargo would violate legislative arrangements between an American company and a provincial government in Canada, there is necessity for the most careful treatment. Aside from such cases, the question of property rights generally is one in which the claims of interested owners should be carefully studied by legal advisers of the government. So far as the Commission is concerned, we are inclined to the view that, inasmuch as large American owners freely admit, through eminent counsel that the Government has full power to treat with any question which vitally affects the status of the natural resources of Canada, the question is one which must be determined by other factors.

8. PULPWOOD EXPORTERS

The large group of individuals in this class took very active part in the hearings of the Commission throughout the country, more particularly in eastern Canada. In addition to evidence offered at the public hearings they presented a brief which is attached as Appendix (3). The latter ably sets out their arguments in very succinct form.

Being in great measure dependent upon the continued export of pulpwood for continuance of their operations, the views of the pulpwood exporters may be said to consist of all arguments which have been, or may be, advanced by any of the other classes to whom reference has been made. In most cases the exporter is, after all, the middleman, through whom the transaction of sales as between Canada and United States takes place. From his own standpoint, the main argument—although this has infrequently been advanced—is naturally that a continuance of exports is essential to his own welfare. Some exporters, however, very active in the campaign against restrictions, have given considerable study to the situation, and have even advanced arguments which related to, and might well have been used by other classes. They point out that pulpwood operation more faithfully serves the requirements of conservation, in that a greater part of the tree is used, and that a smaller amount of slash is left in the woods. The comparison herein made is, of course, between pulpwood operations and lumbering operations—herein the argument is sound; it cannot be argued, however, that operations conducted by or for exporters are more conservative than operations conducted by or

SESSIONAL PAPER No. 310

for Canadian pulp manufacturers. Another argument of some considerable importance is their claim that the taking out of pulpwood, and the preparation of the material by peeling or rossing, involves just as much expenditure per unit of wood as does the logging of timber and the sawing of rough lumber; this argument—in so far as it relates to labour values—has a good deal to support it if the wood is peeled or rossed; but it does not apply to a large part of the wood which is shipped rough; neither does it take into consideration the interest on capital in saw-mills.

Using similar extreme figures to those applied by some of the strongest advocates of the embargo, in comparing the losses by fire, wind, insects, etc., to the depletion brought about by utilization, they argue the futility in restricting exports as a conservation measure. They also take strong exception to the possibility of American mills establishing themselves in Canada if exports be restricted; other factors, they claim, must determine the further development of the pulp industry in Canada.

In addition to opposing the embargo, as a body the exporters also are opposed to an export tax. In support of this position they state that Canada does not control the price of pulpwood in the United States. The case of the pulpwood exporters is very clearly set out in their brief, and it is unnecessary to go into greater detail. In fairness to some of them, it must be explained that, in addition to exporting, they supply Canadian mills with part of their pulpwood requirements. Still further, there are those who, in addition to performing these functions, also are themselves owners of timberlands which they operate for pulpwood; so far as this phase of their business is concerned, discussion of their case relates to that of timber-owners.

9. GENERAL

Many of the classes treated of above have at various times claimed that Canada can in no way control the prices of pulpwood in the United States market. This argument is offered more particularly in opposition to an export tax. The claim is made that, in event of such a tax, the pulpwood-cutter himself would pay it. The Commission is unable to advise just exactly what would happen, because the question as to who would pay the tax depends upon a great many economic factors which are subject to great variation from time to time. As wood is, and for many years has been cheaper in Canada than in the United States, it is possible to argue that under normal conditions American producers would absorb any tax which might be imposed. In view of other factors, which for the time being disturb the pulpwood and pulp markets, however, there is certainly a possibility that an effort would be made to pass on payment of the tax to the wood-cutter.

Present conditions of the pulp market also have been advanced as a strong argument against restrictions. It is pointed out that as European pulp is now being laid down at United States ports at prices lower than those for which Canada can supply the same product—lower even than many American mills can produce it—any action taken by Canada to make manufactured pulp more costly to United States paper manufacturers, by curtailing wood supplies and thus rendering it less accessible to them, would be entirely overcome by the competition from Europe. The Commission has taken occasion to enquire into this situation, and while it is undoubtedly a fact that European pulp is causing a lowering of market prices in regions reasonably accessible to tide-water, this condition is really due to economic factors which may be more or less temporary in character: (a) The pulp industry in Sweden—which country is most active in competition—is not in a satisfactory condition, and finds it necessary to unload products at little or no profit; (b) they operate under rates of exchange

which contribute to lower prices; (c) labour costs are much lower. As pointed out in Part II, however, some of these European countries are, notwithstanding the inherent desire in the governments and the people to conserve their wood supplies, seriously over-cutting their annual increment, to relieve present financial distress. As things become more stabilized, therefore, it may reasonably be expected that European competition in pulp will be less serious. Indeed, there is good reason to believe that the amount of pulp which they now place upon the American market is at or near the maximum quantity which they are capable of making available for export to this continent without reducing their output of other forest products.

By reason of the fact that very frequently pulpwood and saw-timber resources are intermingled; by reason of the fact that timberlands are in some cases operated with both objects in view; and finally, for the reason that protection and management measures must be applied to both of them on the same basis—the view has been conceived in the minds of some, that no action toward restriction of the pulpwood exports is possible, without having very serious effect upon the other branch of the industry. It may be strongly emphasized, however, that regardless of the inherent intermingling of interests, if it should be considered desirable to impose export restrictions, it is absolutely feasible to do so by means and in a manner which will accomplish the object in view, without any serious detriment to other interests.

SECTION B—THE NATIONAL INTEREST

In the foregoing pages, there have been discussed the views of private interests upon the question of restricting pulpwood exports. It has previously been intimated that while such views must manifestly be afforded the most serious consideration, there is the broader aspect of the problem which must, in the final analysis, prevail. The success of farming interests, of lumbering interests, and of pulp manufacturing interests, are individually and collectively of the utmost concern in the industrial development of the Dominion, but so far as they depend for their success upon the timber resources of this country—and inasmuch as their continued success is absolutely based upon the continuance of the forest resources—the interest of one or all of them must obviously be made subservient to the continuance of the forest resource as a whole, so necessary to national development and security.

1. THE SUPPLIES

This subject has been dealt with in great detail in Part I. and for the purpose of applying that information, it is necessary only to briefly summarize. The two important species in pulp-manufacture are spruce and balsam. In one province only, hemlock attains some importance. All other species contribute little to pulp manufacture in Canada. Although with the development of methods, other species may undoubtedly be used, the problem now faced must be solved on present established practice. Similarly, although with our huge forest areas, we have large inaccessible tracts which in the distant future may be brought to some form of utilization, there is no justification for our taking them into serious consideration at the present moment. The problem we are faced with is that of determining the extent to which we may continue the use of the pulpwood species. Unless the fundamental principles of forestry are to be ignored, this use must be based on the extent to which our forests can supply the annual requirements by growth. In other words, conclusions must be based on the principle of living within our income. To ignore this principle, and to make use of visionary timber assets in our calculations, would be quite comparable to the case of a man who, in an effort to place his expenditure on the

SESSIONAL PAPER No. 310

basis of the annual income justified by his assets, adds to his profitable assets the sum-total of all questionable securities, in the hope that they may at some time in the future produce revenue—thus leading himself to believe that he is justified in using a larger income than his assets really permit.

Just as there has been a tendency on the part of extreme advocates of restrictive measures to exaggerate the depletion resulting from annual utilization and other causes, there has been a tendency on the part of opponents of restrictive measures to belittle the amount of wood that would be retained in Canada if restrictions in pulpwood exports should be found necessary. After all, a hundred is comprised of *all* its parts, not ninety-nine. Many a business has been wrecked through failure to realize the effect of the humble one per cent—to say nothing of three, four, or five per cent—in the calculation of income or of use. While the extreme advocates of restrictions may exaggerate out of all reason the benefits to be derived from such measures, the opponents on the other hand frequently take the position that no good whatever can be accomplished by this means. There has also been a tendency to calculate the duration of supplies in Canada as a whole, by the simple process of division of total stand by total consumption, notwithstanding the fact the larger part of our timber is in British Columbia and consequently utterly inaccessible as raw-materials to the industries of the East. As has been thoroughly demonstrated elsewhere, the economic use of land positively demands that forest industries of both classes should prevail throughout the Dominion. On this basis, it is essential that supplies must be considered by regions, if not, indeed, by provinces.

It has been thoroughly pointed out that in the Maritime Provinces the timber supply situation is extremely serious. On the theory of "ultimate exhaustion"* there is only 31 years' supply of the pulp species. On the same basis, in Ontario and Quebec combined, in which provinces the pulpwood industry has its highest development, there is 51 years' supply; while in British Columbia, where the output of pulp is as yet only ten per cent of the Dominion total, there is available 195 years' supply. None of these figures, however, take into consideration the losses due to fire, insects and decay which, in the lack of adequate forest protection, in almost every case except British Columbia offset, or more than offset, the increase due to growth. It has further been pointed out that in the Maritime Provinces—and aside from losses through fires, etc.,—annual utilization of pulp woods by industries already established exceeds by a wide margin the annual increment in those species. In Ontario and Quebec, on the other hand, *aside from losses*, annual growth of pulp woods may be approximately in a state of balance with annual use—although it is open to serious question that the condition is even that satisfactory—but in those provinces all losses due to fire, etc. operate in net depletion of the forest resource. In British Columbia a different condition obtains, and, although the application of better fire protection and better methods of utilization are necessary, there is certainly little fear of exhaustion of supplies.

2. USE OF PULPWOOD RESOURCES

Reference has already been made to the fact that consideration of the problem must be based on timber actually used in the pulp industry. Therefore, although it may be argued that the total depletion due to pulpwood exports represents only 5 or 6 per cent of the total utilization of our entire timber resources, such calculations do not satisfy the situation. Rather, we must confine ourselves to pulp woods proper, and consider that our pulpwood exports of spruce and balsam constitute somewhere from 12 to 15 per cent of the amount of those species used in Canada for all purposes. Therefore, in view of the fact that, for Eastern Canada at least, it has been thoroughly demonstrated that the

*See Part I, Chapter II, Section 10.

consumption of the pulpwood species in all directions results in continuous depletion of the resources, so far as use is concerned, this 12 or 15 per cent constitutes a 1 to 8 factor in depletion, rather than 1 to 20, as so many people have been inclined to regard it.

In gauging the extent to which an embargo might operate to retain in Canada wood which otherwise would cross the American border, it is necessary to consider whether or not it would be applied to all exports, (1) as between different species of timber, (2) as between different classes of timber-owners. As for the first of these, the results may readily be determined by the simple application of figures derived in Part I of the report. For the second, determination is not quite so simple: we may, of course, readily arrive at the conclusion that if farmers' wood were exempted from such restrictions, there is a clear six hundred thousand, or seven hundred thousand, cords of wood which would not be affected; if, however, exceptions were to be made for contracts that may have been entered into, as provided for in an Order in Council of August 14, 1923, the Commission is unable to determine to what extent the pulpwood exempted from such restrictions would reduce the amount which would otherwise be retained in this country.

With regard to poplar, it may be stated that, except in so far as the confinement or restriction in the use of this species to Canada might contribute to the development of industries which can use it as a raw material and thus serve the general economic purposes—there is no need, from the standpoint of forest conservation in preventing its export. The species is prominent throughout Canada, and is more in the nature of a weed. While it has undoubtedly some very limited uses, even in this country, there are so many better varieties which should be the subject of concern that we need give no further consideration to it. Foresters, generally, already have in poplar a difficult problem in utilization, without taking steps aimed to conserve it.

It is upon spruce and balsam supplies, particularly in Eastern Canada, that attention must be centred.

3. MARKETS

The problem of the preservation of foreign markets for pulpwood products, the importance of which has been fully emphasized in Part I, must naturally receive the most careful attention. It may be pointed out, however, that it is not only the present existence of those markets in which we are interested, but also the permanence of them. Generally speaking, this country is in the position where the extent of forest lands and timber resources fully permit of sustention of our forest industries, but in the Eastern Provinces at least, the conclusions of Part I clearly point to the fact that a reduction in the rate of depletion of pulpwood species must be effected in some direction or other. In the Maritime Provinces, *in addition* to proper forest protection, there must actually be a decrease in the amount of spruce and balsam timber removed annually from the forests, unless constant net depletion is to continue. In Ontario and Quebec, if the financial condition permits of providing adequate forest protection in all directions, use on the present scale, through cutting, could be sustained. It may be pointed out, however, that the solution of protection problems to the degree indicated, will entail expenditures and effort very much greater than those now applied.

4. THE ISSUE

With the problems previously outlined the federal government and the provincial governments of Canada are faced. The directions in, and the degree to, which curtailment in the use of pulpwood supplies must be effected, in the various parts of Canada, have been thoroughly indicated in Part I of the

SESSIONAL PAPER No. 310

report. As has already been explained, as between different parts of Canada, there are three degrees of seriousness in the present situation, which must definitely be met with measures to improve conditions. So far as forest conservation—in the usual sense of the term—is concerned, the Commission has been at pains to point out the weaknesses which exist and the steps which should be taken to remedy the situation. The extent to which other measures of an economic character should be applied must necessarily be determined by the extent to which the federal and provincial governments are prepared to go in applying the methods of forest conservation proper to the situations which obtain within their respective jurisdictions. There is a great difference of opinion, as between the officials of various governments, as to whether an embargo, or an export tax, or neither of them should be applied. It may definitely be stated, however, that should an export tax be adopted, the only basis upon which it could possibly be construed as serving the purposes of conservation would be: that all revenue to be derived through the operation of the tax should be applied in forest protection through the federal and provincial services. In the present state of our forest conditions and forest industries, the application of any export tax, ostensibly as a measure of conservation, but actually for the purpose of securing revenue to apply in other directions, would be literally “adding insult to injury”. For generations, our forest capital has carried far more than its proper burden in supporting public expenditures. If, therefore, an export tax were to be applied, its only justification lies in the application of the funds derived therefrom directly to the work of maintaining and developing the forest resource. ✓

So far as this Commission is concerned, we have clearly pointed to the fact that some steps must most assuredly be taken whereby the annual drain on the spruce and balsam supplies of eastern Canada must be very greatly reduced. In some parts, this object may possibly be attained by the complete elimination of fire and insect losses; in other cases, it can only be attained by the elimination of such losses plus the reduction of the amount of spruce and balsam used, either in local industries or in export. The same situation does not exist in British Columbia, and, by reason of the fact that there has been some concern in that province as to the effect of Dominion legislation, it is here necessary to indicate the means by which such legislation could be effected without being unduly harmful to British Columbian interests. The solution of this particular difficulty lies in the fact that those tree species, which it is from a pulpwood standpoint necessary to conserve, are the spruce and balsam. ✓

If, therefore, the pulpwood situation in the eastern provinces demands the imposition of restriction on the exports of these two species, it will readily be perceived that such restriction would have no detrimental effect on the logging or manufacturing of British Columbia. In that province the demand for the export of logs applies primarily to western cedar, Douglas fir and western hemlock. In view of the fact that none of these species even occurs in eastern Canada, it is manifest that no difficulty will be occasioned. A small amount of Sitka spruce is exported from British Columbia, but curtailment or restriction in exports of that species could not be claimed to have any widespread effect. Indeed, even if it did, the spruces which might be included in any restriction to be applied could be defined by their specific names, and in this manner Sitka spruce would be eliminated. Similarly, although a limited amount of “white fir” is exported from British Columbia—and notwithstanding the fact that it has been included under the heading of balsam in our consideration of pulpwood resources—the tree is nevertheless an entirely different species to the balsam of eastern Canada. At the present time, if it be claimed that there

14-15 GEORGE V, A. 1924

is no necessity for restricting the export of white fir (*Abies amabilis*) it would only be necessary to refer specifically to the balsam (*Abies balsamea*) of eastern Canada. Even if it should be desired to serve broad economic principles of home manufacture by restricting the export of poplar (which is not at all necessary from the standpoint of forestry), here again, the use of specific names to designate the class of timber to be so restricted, would obviate all difficulties which might otherwise occur.

CONCLUSION

2/

Owing to the many intricacies involved in the pulpwood export question; in the complications as between forest conservation and trade relations; in view of the fact that the character and extent of the restrictions would necessarily depend upon the extent to which the government might otherwise go in conservation; finally, as the facts have been very plainly and fully laid before the Government,—the Commission takes the view that the actual determination of a policy must rest with the Government.

Respectfully submitted,

JOS. PICARD,
Chairman.

W. A. ANSTIE,
Deputy Chairman.

JOS. G. SUTHERLAND,
Commissioner.

A. B. KERR,
Commissioner.

APPENDIX No. 1

CANADA'S PULPWOOD RESOURCES

WHAT SHOULD BE DONE TO CONSERVE THEM

A Statement Prepared by The Canadian Pulp & Paper Association For Submission to the Royal Commission on Pulpwood, Montreal, November, 1923.

The Canadian Pulp and Paper Association, whose members are engaged in carrying on an industry which annually produces wealth to the value of 150 millions of dollars, and by exporting the major portion of that wealth brings into Canada an annual cash income of over 100 millions of dollars, is convinced that the present rate of depletion of the Canadian pulpwood forests (the source from which all this wealth is developed) is ruinous to the future of the industry, and therefore to the permanent interests of the country. The Association is also convinced that this present rate of depletion can be materially reduced, without hardship to any Canadian interest or injustice to any interest whatever, and the future of the industry be thereby secured, with very great benefit to the economic position of the Dominion.

The purpose of this statement is to establish three successive points:

First, that the rate of forest depletion is now dangerously high, in the sense of involving imminent and certain peril of a grave handicap to the Canadian pulp and paper industry and a marked increase of advantage to its competitors, not in a hundred years from now, not in fifty years from now, but in ten or fifteen years, or even less.

Second, that the rate of depletion cannot effectively be reduced by any action that can economically be taken by the lessees of the Canadian pulpwood lands, or even by the private owners who possess in fee simple some small portion of the total amount of these lands. From this it follows without further argument that the stoppage of depletion must originate in government action, by the provincial or federal authorities or by both. This does not necessarily mean that the whole *management* of the conservation processes must be entrusted to government officials or to politicians.

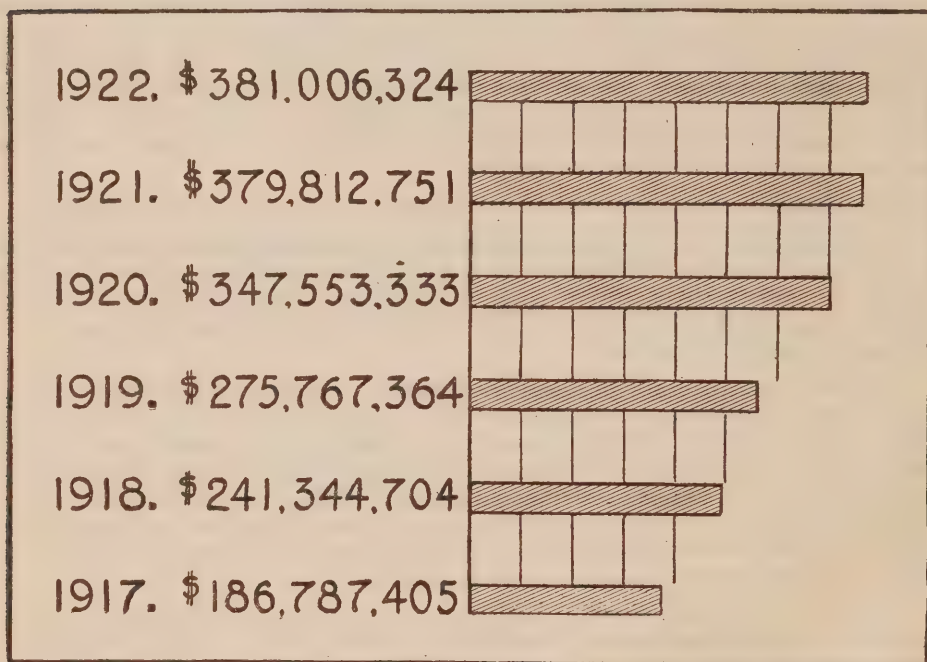
Third, that certain forms of action by both classes of government authority, which in the Association's opinion are calculated to achieve the desired result, are perfectly within the powers of the respective governments, involve no hardships to any Canadian interest, and will work no injustice to any interest whatever.

THE RATE OF DEPLETION

As to the first point, that the present rate of depletion involves a certain prospect of a steady diminution in the advantages now enjoyed by the Canadian pulp and paper industry in respect of cost of production, a diminution not in the far distant future but likely to commence within a few years and to progress with rapidity, until the industry in Canada, from its present character of a swiftly expanding one, will become a stationary and eventually a contracting one.

Exact statistics are not obtainable either for the total amount of pulpwood (wood of the type and size now employed in the manufacture of pulp) in the Dominion, nor of the rate of its diminution by use and destruction, nor of the extent to which that diminution is offset by natural or artificially stimulated growth. Even if the most perfect statistics were obtainable, they would not give us an accurate statement of the case; for it is not only the *amount* of the consumed timber which is of importance, but its geographical situation. The destruction by fire of a hundred square miles of timber in an area which is not likely to be cut for another hundred years is of less consequence, it may be, than the destruction of ten square miles adjacent to an existing pulp mill. The former may be replaced by the unaided action of nature long before the expanding industry has reached out to utilize it; the loss of the latter may materially increase the operating cost of a great Canadian mill within a year, with an increase which will be permanent and irremediable.

CAPITAL INVESTED IN THE CANADIAN PULP AND PAPER INDUSTRY



The growth in the amount of capital invested in the Canadian pulp and paper industry is illustrated above. The figures are taken from the Dominion Bureau of Statistics report and show a steady growth in invested capital from \$186,787,405 in 1917 to \$381,006,324 in 1922, an increase of 104 per cent in this period.

In the absence of statistics we are compelled to have resort to the most expert estimates that are obtainable. Of these there is no lack, and they are in substantial agreement one with another. As the authorities dealing with forests are mainly provincial in character, the estimates are for the most part provincial in area; and as Quebec is the most important of the pulpwood-producing provinces of the East, it is expedient to devote some time to a discussion of the estimates for that province, treating the other provinces more briefly and by means of analogy.

SESSIONAL PAPER No. 310

The American interests which argued at Washington in 1920 in favor of the adoption of the Underwood Resolution were naturally concerned to make as light as possible of the depletion of the Canadian forests. They presented an estimate that the Province of Quebec alone contained a stand of 608 million cords of wood, and that 24,320,000 cords could be cut annually therefrom without depletion if it were conducted as a "scientifically lumbered forest." (The estimate of an annual cut of 4 per cent of the stand is of no great interest, as if that rate of replenishment is the sign of a "scientifically lumbered forest" there is no such forest anywhere in Eastern Canada or in the Eastern States.) As against this we may place the estimate set forth in the government publication, "The Forests of Canada," prepared by the Department of the Interior, at Ottawa, in 1923, under the special care of the Dominion Forestry Branch. In this document the total stand of merchantable timber of every kind of soft wood is given as 871,720,000 cords for the whole of Canada. But of this amount only 65 per cent, or less than two-thirds, consists of good pulpwood, namely, balsam and spruce, the great bulk of the remainder being jack pine, which at present is utilized to a very limited extent. This gives us a total of about 580,000,000 cords of merchantable spruce and balsam in the whole of Canada; but the term "merchantable" refers only to sizes and quality, not to location, and it is therefore necessary to deduct all that immense quantity of pulpwood which lies north of the great divide in Quebec and Ontario, and hence in watersheds running down to Hudson Bay, for such wood, unless it happens to grow within a short distance of the very few railway lines which enter that territory, cannot possibly be brought out to the market. Estimating this inaccessible wood at the moderate figure of 80,000,000 cords, we get 500,000,000 cords as an approximate total for the good merchantable pulpwood of all Canada. Of this the Eastern Provinces are, in the same Forestry Branch 1923 document, estimated to contain 552,210,000 cords of all kinds of soft wood, which gives about two-thirds of that amount of pulpwood, or 368,000,000 cords, and deducting 80,000,000 cords for inaccessibility we get 288,000,000 cords of accessible pulpwood in Ontario, Quebec, New Brunswick and Nova Scotia. It is out of this 288,000,000 cords (and out of only a part of it at that) that almost the whole of the cut of 5,000,000 cords per annum is now being derived; and yet the experience of the best foresters in the Province of Quebec shows that the rate of increment which can be attained by spruce and balsam under the best conditions is only 1.22 per cent per annum.

Before passing from this point to a discussion of the rate of depletion, it may be well to point out that a large part of this stand of 500 million cords is not part of the "operated forests" (whether "scientifically operated" or not) of the present time, but is simply a reserve for the future, the utilization of which cannot take place until the cost of securing wood in more accessible areas has become a good deal higher. The contents of this untouched reserve are stationary, or may by accident be actually diminished; there is no rate of growth upon them whatever, whether 4 per cent or 4/10 of one per cent; there can be no rate of growth upon them until they begin to be cut; they cannot grow one single new log to replace anything that may be cut in the now operated areas, because all that they can do is to replace their own natural decay. They are "matured stands," not growing forests. Whatever rate of reproductive power these areas would possess (and, so far from approaching the one-fifth cord per acre of the American estimate, it is placed by experts at one-twentieth of a cord per acre, much lower than in the operated Canadian lands and the American forests, because of its northern situation and consequently slower growth) is at present being wasted, and must continue to be wasted until it becomes economically feasible to cut timber there. This consideration applies to probably at least 100 million cords of the above estimate, which will continue to be

14-15 GEORGE V, A. 1924

100 million cords (unless diminished by fire) for a thousand years, if that time should elapse before it begins to be cut, and would not contribute one additional tree even though every tree in the other forests of Canada should be cut down or burnt off in the interval.

CONSUMPTION AND DESTRUCTION

So much for the actual pulpwood reserve of Canada. Now for the rate of combined consumption and destruction. The total annual cut of pulpwood in Canada has not hitherto greatly exceeded four million cords, but the present greatly increased rate of export of unmanufactured pulpwood to the United States, together with the coming into action of several new mills in Canada, indicates that a cut of five million cords will henceforth be a minimum figure so long as the accessible woodlands of this country continue to afford such a crop. A small proportion of this total, not exceeding 300,000 cords, comes from British Columbia, the remainder being the product of the Eastern Canada areas already sketched. This of course is the net cut, as brought to the mill or to the port of export; the gross cordage actually destroyed in getting it out is considerably larger.

But if the Canadian forests lost each year only what is actually taken out of them by loggers, the situation would be comparatively cheerful, even admitting that this five million cords is not spread over the whole 500 million cords of standing pulpwood in Canada, but comes out of (and thus allows a natural replacement process in) only some 200 to 250 million cords in forests under actual operation. Such a rate of consumption, while it certainly would not, even with the most scientific forest management, allow anything to be added to the contents of the forests, would not greatly exceed the rate of replacement which could be attained under such management in all but the coldest portions of Eastern Canada. But we have to add to this consumption an unknown but infinitely alarming rate of destruction by fire and by disease.

Statistics of fire and disease loss in the Canadian forests are even less exact than those of forest contents and rate of extraction. But that it has been in the past and still is immensely in excess of the loss by cutting would be admitted by anybody with the slightest knowledge of Canadian forests. The Forestry Department 1923 document already referred to gives what must certainly be considered a very cautious and moderate estimate. Unfortunately, no distinction is drawn between hard and soft wood. The annual utilization (gross) is placed at 2,616,000,000 cubic feet of standing timber, the fire destruction at 790,000,000 cubic feet and the insect destruction at 1,350,000,000 cubic feet, plus an unknown loss due to fungus diseases, with the total result that "the forests have, during the last five years, been depleted at the rate of upwards of 5,000,000,000 cubic feet per annum." This, it is frankly admitted, much exceeds the existing rate of increment, which it is estimated (by the same authority) "should be," *with good management and adequate fire protection*, between 7,500,000,000 and 11,500,000,000 cubic feet. As it is, even with utilization and loss estimated as low as 5,000,000,000 cubic feet, "the forest capital of Canada is being materially reduced, owing primarily to the failure to provide for a future crop while cutting and the lack of protection from fire for the natural reproduction."

But other authorities are even less cheerful.

Mr. Frank J. D. Barnjum, a profound student of the situation and a lumberman of 34 years' experience, speaking with the utmost caution and seriousness before the Canadian Society of Forest Engineers in January, 1923, said:

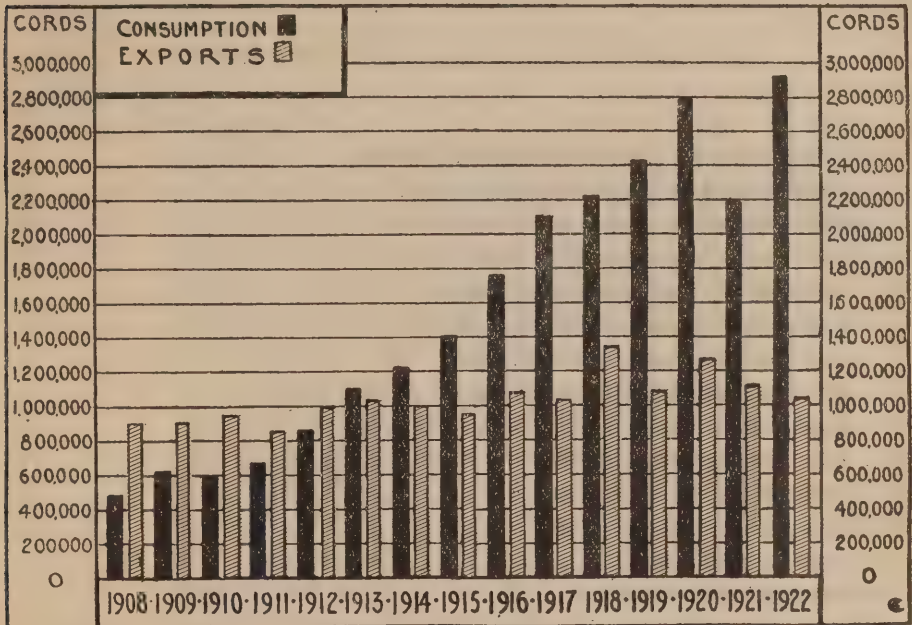
"If you will look over the records of our forest history you will find that the amount of the annual cut is not over one-tenth of the amount of destruction

SESSIONAL PAPER No. 310

by bugs, fungi, fire and wind. If we had only the annual cut to contend with, and there was no loss from the above-mentioned causes, there would to-day be just as much timber in Canada as there was when the country was first settled."

The statement that the annual loss from fires and other destructive agencies is ten times greater than the annual cut, it is fair to state, has been challenged by experienced lumbermen when applied to the particular districts with which they are most familiar, their deductions being arrived at by multiplying the

CANADA: CONSUMPTION AND EXPORTS OF PULPWOOD



The above chart illustrates the growth of the Canadian pulp and paper industry as shown by the increase in our consumption of pulpwood. In 1908, Canadian mills consumed 482,777 cords and in 1922 this figure had risen to 2,912,608 cords. The shaded columns show the exports of pulpwood which have been fairly steady throughout these years. From 1908 to 1922 Canadian exports of pulpwood have averaged 1,025,000 cords annually, all of which has gone to the United States. During the first eight months of 1923, 1,046,367 cords were exported.

annual cut ten times and by showing the impossibility of such a drain taking place; but the statement, nevertheless, receives credence in other quarters and as applying to Canada in general. It must not be assumed that total destruction is the invariable accompaniment of forest fires, since usually much timber is left standing that is subject to salvage. Fire, however, it must be remembered is vastly more destructive than even the most unscientific logging. The logger is obliged by regulations, and to some extent by his own interest, to leave the young trees of the pulpwood species; fire not only destroys, but it leaves the soil in a condition which, as every experienced lumberman knows, allows such unimportant woods as birch and poplar to spring up first, and it is often many years before the pulpwood species attain to their normal proportional strength.

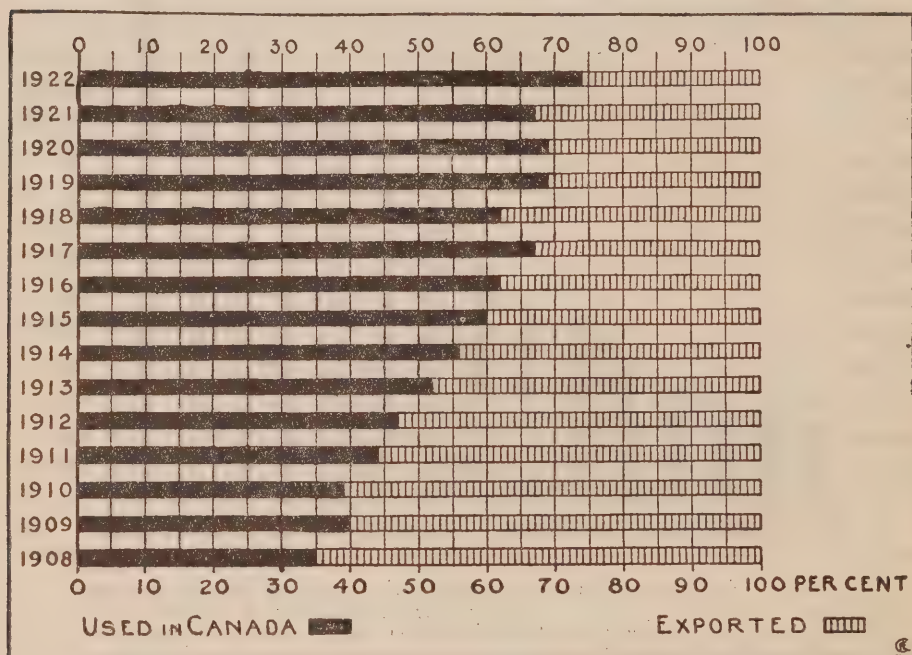
The rate of fire loss rises with the rise of population—until that advanced stage is reached when the forest area begins to be intersected by extensive agricultural clearings, as is now the case in most of the American States; these in

14-15 GEORGE V, A. 1924

time begin to limit the extent of any single fire in a way that is not possible in such vast uncleared areas as those of Northern Ontario and Northern Quebec.

The rate of disease loss, on the other hand, rises as a direct consequence of both fire loss (when the destruction is not fully complete) and of careless cutting. The tree diseases which are most destructive are due, according to Mr. O. Schierbeck, Forestry Engineer, to the over-multiplication of the natural scavengers of the forests, the beetles and fungi, in areas where an exceptional amount of dead wood has for any reason been left upon the ground. This dead wood may be partially burnt trees, windfalls or the wreckage of lumbermen's cuttings; the scavengers multiply in it until they have entirely consumed it.

DISTRIBUTION OF CANADIAN PULPWOOD



The chart shows the distribution of Canadian pulpwood on a percentage basis. The full bar represents the total cut of pulpwood as 100 per cent, the solid black portion represents the proportion made into pulp or paper in Canadian mills, and the shaded portion the amount exported. In 1908 Canadian mills consumed 35 per cent of the total cut and exported 65 per cent; in 1922 domestic consumption was 75 per cent and exports 25 per cent.

and then they turn to attack the living trees. "The loss caused by a fire cannot be counted only as the area burned; the greater danger lies in the fact that it spreads all the forest pests to the unburned sound wood." Nature eventually provides the corrective, because none of these scavengers can flourish on healthy wood as they do on their proper food, the decayed tree, and hence each epidemic of beetles or fungi eventually dies away; but not until it has ruined for generations to come vast areas of healthy trees. One of these pests, the budworm, had a tremendous development in Eastern Canada during the second decade of this century, and it is estimated by Mr. Schierbeck that 150 million cords of balsam, a high-grade pulpwood, is dead or dying as a result of its ravages in the Province of Quebec alone.

SESSIONAL PAPER No. 310

In sum, therefore, we find that in Canada the rate of cutting of the pulpwood forests is considerably in excess of what natural reforestation can offset, having regard to the limited area in which natural replenishment can take place, and that in addition to this exhaustive cutting, which alone would suffice to produce a grave shortage of pulpwood within the lifetime of the present generation, there is a further source of depletion, as set forth above, which must in all certainty be many times as great as the actual cut itself, and which is estimated by one expert authority as no less than ten times the cut. It is obvious that this process cannot go on without paralyzing in a few years the operations of many of the plants engaged in the pulp and paper industry, and so raising the cost of operation to nearly all of them as to deprive this country of its present invaluable advantage over its competitors in the United States and Northern Europe. Space does not permit of more than a reference to what may be termed the secondary consequences of deforestation, namely the diminishing of soil moisture, the reduction of water powers and the lessened fertility of the soil. The function of the forest as a preserver of moisture in the soil and a regularizer of stream flow is now too well known to need explanation. The records of the Shawinigan Water & Power Co., Limited, as quoted by Mr. Julian Smith, the president, show progressive increase in the difference between extreme high and extreme low water, due to the denudations by lumber operations and settlement of the watersheds of streams used for power production, and plenty of other evidence to the same effect is available.

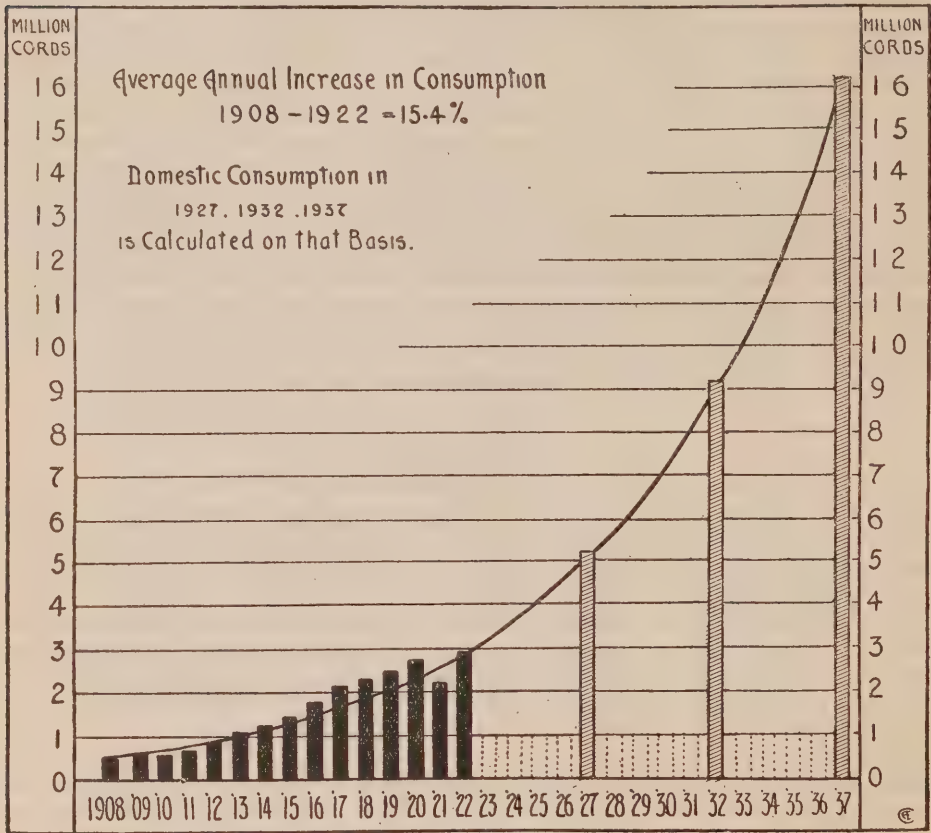
THE COST OF CONSERVATION

It is sometimes alleged, by those who cannot deny the necessity of forest conservation, that the burden of its cost should fall entirely upon those who are engaged in the exploitation of the forests. Those who advance this contention are unfamiliar with the characteristics of the forest industries, and it is not difficult to show that their proposal is economically impossible and intrinsically unsound. The first objection is that no man can be expected to spend large sums for the preservation of that which he does not own. Of the 155 million cords of available pulpwood estimated above for the Province of Quebec only 25 million cords are on lands owned in fee simple by private individuals and corporations; 100 millions are on lands owned by the Crown and licensed (on a one-year license) to operators, and 30 millions are on Crown lands not licensed to anybody. In Ontario the proportions are closely similar, and in the Maritime Provinces the privately-owned lands are a slightly larger share of the whole. Such preservative operations as are now being carried on are mainly on the private lands, and, for reasons which will shortly be explained, they go about as far as is possible in the case of voluntary action by private individuals.

The system of yearly licenses grew up in an age when logging was carried on mainly for lumber purposes, when forests were plentiful and when the "plant" required on or near the limits was small and more or less transportable. It may not be permanently suitable for an industry such as pulp and paper, involving millions of dollars of investment in machinery and water-power and in town developments, which must be permanently established at a point where logs can be assembled cheaply for generations to come. But at all events it is the system under which pulpwood lands are granted by governments to the operators who are to exploit them. There is naturally a moral obligation resting on the governments to continue the license from year to year, but the terms of the license may be, and from time to time are, changed as the government sees fit. In effect the license-holder at the end of each license year possesses nothing but a first claim on the right to take out a new license for the coming

year at the government's own terms. There is an annual rental per square mile and a stumpage charge for timber cut, and both of these may be raised and have actually been raised at the government's discretion. That the license has a certain permanent quality, vague though it must be under these conditions, is

**CANADA'S POSSIBLE CONSUMPTION OF PULPWOOD
FOR THE NEXT FIFTEEN YEARS**



The above chart shows the actual consumption of pulpwood by the Canadian mills during the years 1908-1922. In 1908 the consumption of wood was 482,777 cords; in 1922 the consumption was 2,912,608 cords or more than six times as great. During these years the average annual increase in the consumption of pulpwood by the Canadian mills was 15.4 per cent. The curved line shown above is based on this annual increase of 15.4 per cent and if in the next fifteen years the domestic consumption of wood increases at the same rate we shall require for our manufacture of pulp and paper the quantities indicated.

however recognized by the fact that when any area is first put under license, the license is sold by the government to the highest bidder, and that provision is made for the transfer of licenses from one owner to another at a prescribed fee. It is also admitted that the licenses are accepted as collateral for loans, and that a cancellation is practically unknown, but these facts do not alter their actual status as year-to-year leases.

With ground rents, stumpage dues and cutting regulations, all of them a matter of complete uncertainty as regards the future, it is obvious that the

SESSIONAL PAPER No. 310

policy of licensees must necessarily be the getting out of enough timber to pay the capital cost of their licenses within the first few years, while terms and conditions are likely to remain unchanged. They are limited by the Crown regulation as to size of trees and other matters, and to go any further than that in the direction of forest preservation would simply be adding very greatly to the cost of their timber for the sake of growing additional trees, which may not be cuttable for fifty years and which by that time may be of no interest whatever to the present licensee. The return for any investment made in reforestation or other branches of scientific forestry is so excessively remote—a matter of fifty to one hundred years—that even where the forests are the absolute property of the investor it is impossible to secure capital for any such undertaking unless the price of the resultant product is exceedingly high. In very few places can private capital, even where most plentiful, be found embarking upon such protracted adventures except to a very limited extent; the business man will put his money into enterprises where the return, beginning in two or three years from the investment, will be completed in thirty, forty or fifty years, but he will hesitate when asked to invest in a crop which will not ripen until his grandchildren are ready to spend its proceeds and which can yield nothing whatever until it is ripe. Still less will he put it into such a crop to be grown on land that is not his actual property and that is subject to a rental charge which he can neither control nor foretell.

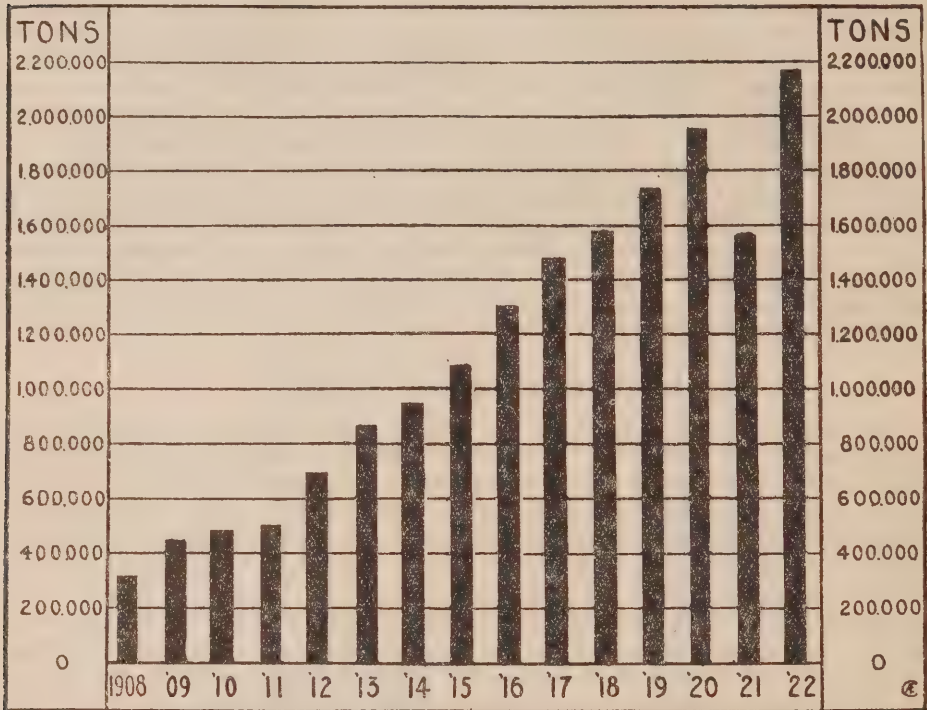
COST OF FIRE PROTECTION

And what is true of reforestation and of scientific forest management is equally true of fire protection. The timber that is destroyed by forest fires is not, in the vast majority of cases, the property of a private owner. The licensee has an interest in it, but it is not that of an actual owner. Its destruction means nothing more to him than that, at whatever future date he would have begun cutting it, he will have to go further afield and harvest at higher cost less desirable timber, and possibly even take out a new license on new areas of government land. If he has built an expensive mill which must be kept supplied with wood, his interest will be more acute; but many license-holders have no mills in connection with their limits, and some have no mills at all, and merely cut pulpwood for sale to the best bidders. The price at which these latter (whose interests in the limits is of the most temporary kind) can sell their product is naturally a governing factor in the price that can be paid by any mill-owner for getting timber from his own limits; if the mill-owner pays more for his timber (in capital cost of license, plus ground rent, plus stumpage dues, plus cost of extraction of wood and maintenance and preservation of limits) than his competitors pay for timber on the open market, he is headed straight for bankruptcy, and the fact that in fifty or a hundred years from now he may be the license-holder of a very rich and high-grade forest (belonging to the province) will not help him in the least.

But there are further reasons, apart from the lack of permanent property interest, why it is impossible for limit holders, whether owners or licensees, to make effectual efforts to protect and replenish the forests without action by the government. The most important of these is the fact that the risks are not isolated. The forest of one limit-holder may be impaired by fire or disease originating in his own territory, but it is much more likely to be impaired by invasion from somebody else's limits (or unlicensed government property) outside. A limit-holder might spend ten per cent of the annual value of his crop in protecting his own limits from fire and disease, but unless his neighbours do the same thing his risk will be almost as heavy as it was before. This fact constitutes an obstacle, not only to any effectual effort towards fire pro-

tection except where a large body of owners can get together and organize protection for a whole geographical area, but also to any expenditure by individual concerns on reforestation; for whatever sum is expended on reforestation will be exposed during the whole fifty or one hundred years of growth to the imminent peril of loss through fire or disease originating beyond the control of the planter.

CANADA: PRODUCTION OF WOOD PULP



This chart represents the total production of wood pulp by Canadian mills from 1908 to 1922. In 1908, the production of wood pulp, all grades, was 854,624 tons; in 1922, the total was 2,150,251 tons. The average annual increase in production during these years was 10.8 per cent. Of the quantity produced during this period, Canada has used, approximately, 62 per cent in her own mills for manufacture into paper and other products, and has exported 38 per cent.

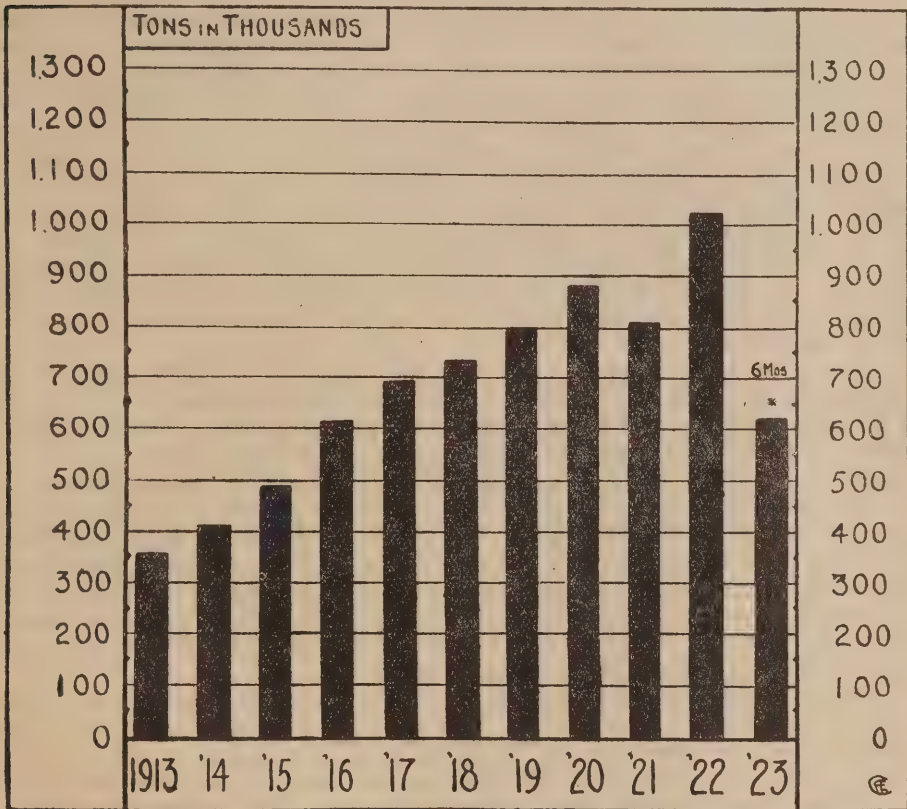
Broadly speaking, the poorer the forest, the greater is the probability of its originating a fire. But it is precisely these poorest forests which are least capable of the expenditure necessary for effectual fire protection. A limit which has been cut over, and is therefore of little immediate value to its licensees, though they may be willing to retain the license with a view to cutting it again in ten years or so, is likely to contain a great deal of slash and abandoned rotten wood, the source both of fire risk and of disease. Burnt and diseased areas dry up more readily than healthy ones, and thus offer opportunities for new fires. The perfectly healthy and therefore most valuable forest needs least effort to protect it against fires originating in its own territory, but *cannot* by any human power be protected against fires originating in poor areas and getting well under way. In other words, the task of protecting the good forest must begin in the poor one. This means that it must be per-

SESSIONAL PAPER No. 310

formed under government authority. For the owner or licensee of the poor forest will never voluntarily spend money to protect, not his own area which is hardly worth protecting, but the areas of his richer neighbours.

The city fire brigade attends ten fires in sheds and shacks for one in a first-class building; but if it did not bother about the sheds and shacks the first-class building would eventually be swept away in a conflagration; and we do not ask the sheds and shacks to bear more than an insignificant fraction of the cost of the brigade. There is no difference between the city buildings and forests, except that a good building is, even without the fire brigade, much less exposed to fire risks *from outside* than a good forest.

NEWSPRINT PRODUCTION IN CANADA



In the ten-year period, 1913-1922, the production of newsprint in Canada has increased from 350,000 tons to 1,086,000 tons. For 1923 the production for the first six months only is given and if this rate of production is maintained it is expected that Canada's total output of newsprint in 1923 will exceed 1,250,000 tons.

GOVERNMENT ACTION

If it is by now admitted that forest preservation is urgently needed in Canada, not so much in the interests of the present owners of forests and pulpwood mills as in the interests of permanent and growing pulp and paper industry, and therefore in the interests of Canada as an economic unit; and if it is

now admitted also that no great advance on the present measure of conservation can be achieved by individual action by private limit-holders, we may pass to a discussion of the possible kinds of action by the two classes of governments, federal and provincial, and of the arguments for and against each of them.

The federal government has no power over property rights within the provinces, and can only intervene when property begins to enter into inter-provincial or international commerce. One particular exercise of its powers in this latter sphere, in the shape of restricting the exportation of unmanufactured pulpwood, has been suggested and will be discussed later. The possible types of action by the provincial governments, both as sovereign powers in the sphere of property rights and as owners and lessors of 95 per cent of the forests, are so much more numerous that they may well be considered first.

And to begin with, let it be premised that concerted action and the utmost possible uniformity of legislation is highly desirable as between the four Eastern Provinces, whose conditions are closely similar and whose forest products are all in close and constant competition one with another, while their forest areas, in the case of Quebec and Ontario, are sufficiently close to one another to allow of the ready passage of fire and tree disease from one province to another. To impose more stringent regulations or heavier dues in one province than in another involves grave hardship to the lumbermen of that province; but if the charges and regulations are uniform in the whole area both benefits and cost will be evenly distributed. In fixing acreage dues, it would, of course, be necessary to take into account the varying productivity of the different areas as the yield per acre in one province may be much higher or much lower than that in another.

Second, let it be borne in mind that the forests of all these provinces are producing large amounts of income for the provincial exchequer, of which only an insignificant portion is being spent on their conservation. The Province of Quebec in 1921 was taking \$4,500,000 a year out of its forests as provincial revenue, and putting back about \$400,000, the cost of the administrative staff and of a small amount of fire protection. The amount put back has increased somewhat during the last two years but is still inadequate. The State Forest Service of Sweden expends fifty per cent of its revenue on forest improvement and upkeep. Seeing that the revenue of Quebec is being acquired as the result of operations which are steadily and rapidly diminishing the timber supply, it seems to be a very clear case of securing current income by the sale of capital assets. The province is largely living on posterity.

Provided that the regulations are made uniform over the entire Eastern Canada area, and provided also that they are accompanied by a more generous expenditure by the provinces for the preservation of the forest heritage of the future, there is no doubt that considerable improvements could be effected in the method of exploitation as at present practised. The compulsory removal of "slash," the small wood taken from the felled trees in reducing them to transportable logs, is a very commonly suggested improvement, and would certainly reduce immensely the risk of disease and fire. The companies which would like to practise slash disposal are unable to do so now for the competitive reasons outlined above, but would welcome a regulation which made it compulsory. The same is true of the enforcement of a more selective cutting policy.

The question of slash disposal, however, it is to be noted, is a moot one among forest owners and operators. Some contend that such disposal is impracticable and others that it is unnecessary. It is admitted that it would add greatly to the cost of harvesting the wood.

DESTRUCTION BY SETTLERS

A large part of the fire losses are due to the introduction of settlers into areas close to the forests and the complete failure of the provincial authorities to enforce upon them the most elementary rules for fire protection, or to imbue them by educational methods with a proper care in the handling of fire. In one respect the Quebec law actually makes a fire on his own land beneficial to the settler, as he is thereafter permitted to cut and sell an unlimited quantity of timber from the burnt-over area (which may still contain a lot of good wood), whereas without a fire he may only cut five acres a year. The whole policy of admitting settlers into timber lands is open to grave question; the settler maintains himself for a few years by completely stripping his land of timber, five acres at a time or with the help of a fire, and when this is done the land, which has been ruined as forest for a hundred years to come, is as likely as not to prove valueless as plowland, and the settler moves on to repeat the operation elsewhere. If settlement could be confined to areas of proved agricultural value, much would have been done; and after the settlers have been rendered harmless, the fishermen and hunters, another prolific source of fire, might be subjected to much more stringent regulation and much more energetic enforcement. A system of proper land classification is an essential corollary to the adoption of any scientific forestry programme for the provinces. At present, "settlers" are frequently placed on land that has no arable possibilities whatever. They strip the land of its wood and then abandon it, leaving it in a condition that renders it utterly valueless. There is so much arable land in every province awaiting settlement that it would appear to be unnecessary to invade land suitable only for tree-bearing for this purpose. A proper classification of all government lands would tend to clear up this situation.

But many of the causes of fire and disease in the Eastern Canadian forests cannot be eliminated even by the best regulations until many years have passed; and one thing in which the provincial governments should take early action is the provision of an efficient force for detecting and checking fires in their earliest stages. At present the governmental expenditure on this head is comparatively nil. In one or two areas several limit-holders have been able to organize together for mutual protection, though for the reasons already outlined their efforts are necessarily restricted. Fire protection, if it is to be effective at all, must be extended to all the forest areas of the country, or at all events to all those which are within striking range of any timber which is now accessible. It should be scientific, involving the promptest possible means of detecting and reporting outbreaks anywhere in such areas, and an adequate force of men and machinery so stationed that they can deal promptly with any fire reported. And it should be disciplinary and educational, endowed with ample authority and incentive for the enforcement of the safety laws, and with funds and machinery for instructing all classes that the happiness of future generations depends upon the carefulness of to-day. The forests are not merely so many dollars' worth of property owned by individuals or the state; they are, if preserved, the sources of the healthy, happy and remunerative employment of thousands of Canadians for indefinite generations to come, and if destroyed they may be the source of poverty and hardship to many thousands of other Canadians, some of whom perhaps have never seen a stand of timber or handled an axe or entered a pulpmill.

THE EXPORTATION OF PULPWOOD

A method of conservation which has been adopted by all the pulpwood-owning provinces, and which has been generally approved by everybody inter-

14-15 GEORGE V, A. 1924

✓
ested in the permanence of the Canadian forest industries, is that of prohibiting the exportation from Canada of pulpwood in an unmanufactured state when derived from crown lands. So far as it has been effective (and its operations have naturally been limited by the fact that timber from lands in private ownership has remained free to leave the country in the log, while in one province even crown timber has been exported after the merely preliminary process of barking), it has tended to diminish one type of consumption of our forests, namely that caused by the American pulpmills which are nearing the end of their domestic supplies and have sought wood across the border. It has already been suggested that this tends to be a more extravagant and destructive kind of consumption than that which is performed by limit-holders who have erected pulp and paper mills in strategic relation to their limits, and have hence a distinct interest in the permanence of the supply. In support of this view it may be mentioned that practically none of the great American pulp concerns which import raw pulpwood from Canada have participated in any of the concerted efforts towards conservation which have been carried on by the owners who have mills in Canada; and also that all of these American concerns possess large timber limits in the United States, which they are conserving by cutting as little as possible while they fill their requirements by importing wood from Canada. Their attitude towards Canada is, naturally and necessarily, that of getting what they can while the getting is good; a tree saved in the United States, where they can always get at it, is easily worth two trees chopped down in Canada, between which and their mills there may at any time arise the barrier of an export or an import duty, an embargo, or a sharp increase in the cost of transportation.

The license clause prohibiting the export of unmanufactured wood does not, as already mentioned, prevent the export of unmanufactured wood from privately-owned lands, and the demand for such wood has in the last few years become extremely urgent. The enormous extent of this trade is shown by the fact that out of less than six million cords of wood used annually by the paper manufacturers of the United States, over a million cords have been drawn from Canada yearly for the past fifteen years, and in spite of the limited sources from which exportable wood can now be procured the amount is increasing rapidly. The rate of export for the half-year just ended has approximated one and one-half million cords annually, and is likely to be maintained throughout the year. This is much more than a quarter of the total net cut of the Dominion. In other words, while we are depleting our forests at a rate which threatens to produce a famine within a lifetime, we are doing so largely in order to provide another nation with the wherewithal to save it from further depleting its own.

It is now proposed to put a stop to this exportation by an embargo declared by the federal government in virtue of its powers over trade and commerce. Such an embargo would cause for a time a sharp reduction in the Canadian cut, for the Canadian mills would be unable to absorb immediately so large an amount of additional wood as one and one-half million cords a year.

It is generally conceded, however, that another consequence would be that American concerns, now more or less dependent on Canada for their pulpwood, and who control forest areas here, either under license or in fee, in addition to being forced into making greater use of their American resources, would immediately proceed to build pulp mills in Canada in order to grind their wood here and export it in the form of pulp. In doing this they would only be following the precedent set when the provincial regulations requiring wood cut from crown lands to be put through at least one process of manufacture before being exported were given effect. These regulations date from 1910. They were followed by an immediate expansion of the pulp and paper industry which has

SESSIONAL PAPER No. 310

continued progressively until it has reached its present important stage. Without the restrictive regulations there would have been no such expansion. The charts which appear herewith give a graphic representation of the remarkable development of the industry during the last fifteen years. While in some cases these records date back to 1908, the real development began in 1910. Since that year the consumption of pulpwood by Canadian mills has shown a constant increase (with the exception of 1921) from a total of 598,000 cords to almost 3,000,000 cords in 1922.

The tremendous increase in the domestic consumption of pulpwood is naturally reflected in the corresponding increase in the production of various grades of pulp and paper, which are shown in the following table:

	Production	
	1910	1922
	Tons	Tons
Mechanical Pulp.....	370,195	1,241,185
Chemical Pulp.....	104,409	909,066
Newsprint.....	215,000	1,081,364
Other papers.....	*	285,451

In the fiscal year 1910, Canada's total exports of pulp and paper were valued at \$4,464,197; while in the twelve months ending March 31, 1923, the total exports were valued at \$122,554,889.

Similar restrictions placed upon wood cut from private lands, it is logical to suppose, would stimulate still further the development of the industry and thereby prove of the utmost economical advantage to Canada. To the extent that this industrial expansion resulted in increased consumption of pulpwood, such a measure could perhaps not properly be classed as assisting conservation, but it would take a considerable number of years of even the most rapid expansion conceivable to overtake the inroads at present being made into our supplies by the system of unrestricted exportation now permitted.

Timber can be cut and exported from Canada with practically no capital investment whatever, except the original price of the limit; but the timber now exported from Canada would, if kept in Canada until manufactured and then exported, bring about (and amply remunerate) a capital investment in this country amounting to \$150,000,000. It is sufficient to keep 33 pulp and paper mills, each producing 100 tons a day, in operation throughout the year and to give employment to 8,250 operatives earning \$11,140,500 in wages. If these mills could all be erected in a single municipality, they and the subsidiary trades and industries which would be needed in connection with them would alone constitute a city larger than any in Canada except Montreal, Toronto, Winnipeg and Vancouver. These figures are not cited with a view to arguing that the mere influx of capital into Canada would be beneficial, for such an argument would be entirely outside of the scope of this statement, having nothing whatever to do with the conservation of pulpwood. The point is this: that every owner of a pulp and paper mill in Canada, representing as it does an immense permanent investment of capital, the productive power of which depends on a continued supply of pulpwood, is a factor working strongly for conservation, whereas every owner of timber lands who exports unmanufactured wood is interested in the present alone, and can be relied upon to strip his land in five years if the price is high and the net return on a policy of conservation threatens to be low or too long deferred. Logging, separated from the subsequent processes, is purely and simply an exhaustive industry, and has proved itself such all over this country for a hundred years; but logging, plus the costly manu-

*No records available but the quantity was insignificant.

facturing industries of pulp and paper, is a permanent and highly conservative industry, with the highest incentive to crop and replenish the soil and enlarge, rather than diminish, the supply of raw materials.

It should here be pointed out that the action of the Canadian Pulp and Paper Association in discussing this particular method of diminishing the danger of exhausting the forests is dictated solely by a regard for the permanent good of Canada and not by any consideration of present profit. The American mills which are now kept in operation by the use of Canadian pulpwood are for the most part old and of an obsolete character, with an extremely high operating cost. They are in any event being gradually abandoned or converted to other uses, as their share of the output is taken over by newer mills; but this process is slow and will last for many years. The stoppage of their supply of Canadian wood would contribute to their finish; and since the American paper market must have a constantly increasing supply of pulp, it is fair to assume that they would be immediately replaced by new mills of the most modern type, erected at the best available sites in Canada. Operating costs at such mills would be lower than at many of the old mills, and the existing Canadian plants would be faced with a much more formidable competition. The only compensation which the present Canadian manufacturers can expect, and the compensation which leads them to favor this method of conservation, is the fact that, once established in close and permanent relation with their Canadian sources of raw material, these new mills would have as keen an incentive for the preservation of the forests as any plant now operating in Canada; and the practice of "mining" or recklessly imperilling areas of wood-pulp timber would cease to be profitable to any owner of such areas in Canada, while the amount of capital and labor in Canada directly concerned in conservation would be increased by immense additions. Every cord of wood now exported, and bringing into Canada about \$6 for the cutter and another \$6 (average) for the railway, would then bring into Canada \$50 to \$60, which would be divided between the remuneration of labor and that of capital.

There are two alternatives to the embargo proposal which also deserve a brief consideration here. One is the use of an export tax in place of an absolute prohibition. This, if made high enough, would reduce, if it did not completely abolish, the drain on Canadian forests by American pulp mills, and in so far as exportation still continued, the resultant revenue could be expended on conservation. It is open to the objection that an export trade, however undesirable, which has once become a source of revenue to the government is likely thereafter to be encouraged rather than repressed; while the revenue could under no circumstances be great enough to provide an adequate conservation fund. The second alternative is the use of the embargo proposal in negotiations for a further tariff concession by the United States, in the shape of free admission of papers other than newsprint, such as book, writing, wrapping, tissues, kraft and blotting papers. These now bear a duty of 25 per cent and upwards, and are nearly all affected by the same condition (shortage of raw materials) as led to the removal of the newsprint duty; so that the placing of them on the free list would not be contrary to any general American interest. It would lead to a sharp increase in the amount of capital invested in paper manufacturing in Canada, with the same result in the shape of an increased interest in conservation; and it would possibly effect the removal to Canada of some mills now using Canadian pulpwood and thus cut down our unmanufactured export. The history of the Canadian newsprint industry since 1910 shows that free access to the United States for the manufactured product is all that is required to bring about a very large transfer of the manufacturing industry to this country, especially when combined with a prohibition of unmanufactured export from crown lands.

SESSIONAL PAPER No. 310

If it be granted that an embargo on unmanufactured wood would be a step towards conservation, it must still be ascertained whether it be constitutionally and economically possible. It is sometimes argued that parliament does not possess the right to prohibit exportation of anything, at least in time of peace; but since the Dominion government is to-day prohibiting, five years after the close of the war, the exportation of gold, and allows the exportation of hydro-electric power only under license, the point does not seem to be very well taken. Neither is it of any great importance, since if an embargo were proved to be unconstitutional, a prohibitive export duty would achieve the same object, and nobody questions the right of the Dominion to impose any duties or regulations which it chooses in the case of exports as of imports. A more serious objection is the claim that it would be an unfriendly act towards the United States, which is energetically advanced by the American Paper and Pulp Association through its president, Mr. Henry W. Stokes. This claim is based on two separate arguments, which must be examined separately. The first is that it diminishes the property rights of certain American citizens and corporations who own timber lands in Canada; but since the embargo would diminish equally the property rights of large numbers of Canadian citizens and corporations and of some non-Canadian British and other foreign subjects - in short, of anybody who happens to own that type of property—this argument really relates to the whole question of property rights, and not to the United States in particular, and will therefore be dealt with later on. The second argument is that the American pulp manufacturer as such, and irrespective of whether he is an owner of Canadian timberlands or not, is entitled to buy pulpwood from Canada. The reasons advanced for this claim are (1) that the prohibition of such purchases would be disastrous to the paper industry of the United States. This is extremely farfetched since Canada supplies not to exceed 20 per cent of the pulpwood now used in the United States for paper-making purposes, amounting to about 6,000,000 cords a year. It might also be replied that the last change in the United States tariff was disastrous to equally important industries in Canada, but that nobody thought of questioning the right of the United States to adopt it. (2) That the price of pulpwood in the United States would rise; to which it might be replied that the losses of the American pulpwood buyer would appear to be counterbalanced in that matter by the gains of the seller, and that Canada's action would thus be far from "unfriendly" to those Americans who happen to be "long" on wood. (3) That more than a million cords a year would be added to the drain on the fast-diminishing wood resources of the United States; to which the answer is that our resources are also diminishing, and that the right of a nation to conserve its own resources is superior to any possible right of another nation to make use of them. Incidentally it may be pointed out that the United States is perfectly capable of supplying its own pulpwood requirements from its own territory, when Alaska is included, and that nothing but the lower price of Canadian wood prevents the exploitation of the Alaskan forests. Secretary of Agriculture Meredith stated in 1920 that Alaska contained pulpwood areas capable of producing two million cords a year for all time. The argument that Canada is obligated to exhaust her own forest reserves by selling wood to the United States while that country completely neglects the cropping of her own reserves seems farfetched.

The effect of the embargo on property rights deserves a brief consideration. The right of the sovereign to prohibit the transit of goods across the national boundaries in either direction is one of the oldest attributes of sovereignty, and has been exercised by sovereign states without question ever since international law began to be a science; and it is inconceivable that a country with so high a conception of national sovereignty as the United States would ever question it.

England prohibited the export of unmanufactured wool as early as Edward III. and again from 1660 to 1825, always with a view to stimulating the manufacturing industry. Foreigners, so far from having any special rights, were under Edward IV prohibited from exporting wool while permission to do so was granted to Englishmen. Generally, the principle is held that foreigners who become possessors of goods within any country become subject to any restrictions of their property rights which may be imposed upon citizens, unless special privileges are guaranteed by treaty. There is thus no question as to the right of the sovereign power to arrest pulpwood or anything else at the national boundary, whether belonging to Canadians or to foreigners. The real question, owing to our system of divided sovereignty, is whether the particular aspect of sovereign power which is involved pertains to the Dominion or to the Provinces. Contentions have already been raised by provincial authorities, which suggest that if the Dominion should seek to exercise the power, the question would have to go before the Law Lords; but the man in the street will have little difficulty in determining that the matter is more likely to be covered by the term "Commerce" than by anything else in the British North America Act.

An embargo, therefore, offers a prospect of a considerable improvement in forest conservation, is constitutional and economically feasible. There is one other possible consequence which ought perhaps to be considered, and that is the adoption by the United States of some form of friendly retaliation, the form usually suggested being the stoppage of coal exports to this country. If the United States were in a position to stop all coal exports, this might be a serious possibility; but while the time may come when she will find it greatly to her interest to do so (and for that reason she is not at all likely to dispute the right of embargo to-day), she cannot do so now without serious detriment to the mining and transport industries, which would not be offset by any benefit to any interest whatever. And the stoppage of shipments of coal to Canada alone, leaving it free to move to any other country, would certainly constitute a breach of international comity, while it would do almost as much harm at home as the complete embargo. Speaking generally, it may be said that Canada is not enjoying any benefits from commercial relations with the United States, except in virtue of some equally important benefit which the United States is herself enjoying as a result; so that none of the benefits which Canada is enjoying can be curtailed except at the cost of a similar and serious curtailment in the United States. The proposed embargo, however, is a step which is so entirely within the rights of any sovereign nation, and so obviously dictated by a sole consideration for the general and permanent interests of the Dominion, that there is scarcely the smallest probability of its being resented by the American people or government; the language of those who will be adversely affected by it, because they have been in the habit of utilizing Canada's forest resources to save them from falling back on their own more distant ones, is intended merely to alarm the Canadian government and deter it for a time at least from taking action.

Much has been made of the fact, in some arguments dealing with proposed embargo, that the United States now admits free of duty some grades of paper and of pulp and for that reason, it is urged, Canada should continue to permit free access to the raw materials of which these products are composed. It is true that the present American tariff imposes no duty on newsprint paper or on pulp. The privilege of shipping in these commodities free of duty is shared by Canada with other countries notably Sweden, Norway and Finland. From none of these countries other than Canada does the United States derive raw pulpwood, so that the right to import raw pulpwood in exchange for the American market for paper does not and never has entered into the consideration. Free entry is accorded solely on account of the fact that the United States is unable

SESSIONAL PAPER No. 310

to supply its own requirements of pulp and newsprint. On all other grades of paper, such as wrapping, book and writing, boards, etc., which Canada is in a position to produce in large quantities for the export market, the American duty ranges from 20 to 35 per cent ad valorem and acts as a complete barrier to exports from this country. Certainly the claim of the United States to unrestricted exploitations of Canada's raw paper-making material would rest on sounder ground if that country were willing to accord duty-free entry to the finished products made from such raw material.

ADDENDA

Newfoundland, next to Canada, leads all other British overseas dominions in producing pulp and paper. Developments now going on in that country will very shortly add to its prestige and place it among the largest producers of newsprint paper in the world, ranking alongside of the United States, Canada, Sweden, Norway and Finland. The Crown Lands Act, cap. 129, Consolidated Statutes of Newfoundland, has for many years contained a provision inhibiting the exportation of unmanufactured pulpwood. It reads as follows:—

"Sec. 43. No holder of a timber or pulp license shall take or carry away for exportation from the lands licensed any trees, logs or timber, unless and until the same have been manufactured either into paper or paper pulp, sawn lumber or other saleable products of timber, under a penalty of not less than twenty dollars for every tree cut, to be recovered by suit in the name of the Minister of Agriculture and Mines; and trees or timber cut into cordwood or other lengths shall be held not to be saleable products of timber for the purposes of this section."

This Act was subsequently modified, in 1921, by the passage of "The Exportation of Timber Act," permitting the exportation of a certain amount of round timber, cut under special conditions, but limited in its application to timber cut within a period of four years and not applicable to license holders already under contractual relations with the government. This Act requires the payment of a duty of one dollar per cord upon all timber exported under its provisions. Generally speaking, Newfoundland still prohibits the exportation of unmanufactured pulpwood.

AN AMERICAN OPINION ON THE POLICY OF EXPORTING RAW MATERIALS

"No country on earth can get rich shipping raw materials. Raw materials are simply the basis for the employment of labour, and labour creates the wealth which comes out of the use of raw materials. Wherever raw materials can be utilized at home, whether that be the United States or Canada, whether, so far as this country is concerned, it be the utilization in Alabama, for instance, of coal and ore, carrying the raw materials through to the finished product; whether it be in Louisiana in the utilization of gas or oils and sulphur, the *Manufacturers' Record* is heartily in sympathy with the policy of using these raw materials at home to as great an extent as possible. It does not believe that we can by legislation prevent the shipment of raw materials from one state to another. That would be unwise under our form of government. Canada has a perfect right to utilize its raw materials at home if it decides to do so. We have a perfect right to utilize our raw materials of all kinds at home for the production of manufactured goods, preferring to ship the finished product into Canada or other countries rather than send the raw materials abroad. It would be better, for instance, for this country if we could turn all of our wheat into flour and ship the flour rather than the wheat, but that point has not yet been reached."—From the *Manufacturers' Record* (New York).

CANADA'S MANIFEST DUTY

"We must either manufacture the raw materials of Canada within the country—thus employing labour, rearing new communities, providing local markets for merchants and producers, strengthening the national structure, making the back of Canada strong to bear its accumulating burdens—or the sons of Canada will follow these raw materials out of the country, establish themselves in foreign industrial centres, and, more and more, from year to year, the national burden will become heavier and the issue of the great political experiment in which we are engaged become more difficult and uncertain. Every sound economic and natural reason, therefore, demands that the raw materials of Canada shall be manufactured in Canada, and the Canadian people protected in the possession and control of their natural inheritance."—Sir John Willison, as President of the Canadian Reconstruction Association.

CANADA'S PULPWOOD RESOURCES

Supplementary Statement to An Argument Presented to the Royal Commission on Pulpwood by the Canadian Pulp & Paper Association, at Ottawa, November 5, 1923

In view of the effort, made by counsel for American interests engaged in the export of pulpwood from Canada to the United States, to represent the statement entitled "Canada's Pulpwood Resources," submitted to the Royal Commission on Pulpwood at Ottawa, on November 5, 1923, as inconsistent with a previous publication entitled "A Handbook of the Pulp and Paper Industry," issued in 1920, it seems desirable to refer in detail to the alleged points of difference. These alleged inconsistencies are due to the acquisition between the dates of publication, by government experts and private experts alike, of a much more carefully based and reliable knowledge of the forests, which has diminished both the estimate of their size and the belief in the rapidity of their replenishment. In both the 1920 and 1923 documents of the Association, the latest government estimates of the size and contents of the Canadian forests were employed. But in the earlier work, the latest available estimate was that of the now defunct Commission of Conservation, made several years ago. This estimate was superseded by one published in 1923 by the Forestry Branch of the Department of the Interior, in "The Forests of Canada." The difference between the two sets of figures is not, however, as great as has been suggested. It is due in part to more careful surveying and in part to a truer realization of the extent to which fires and other destructive agencies have reduced the nation's heritage of standing timber.

In the 1923 "Forests of Canada" there appears on page 42 the following:—

SESSIONAL PAPER No. 310

TABLE VII (a)—ESTIMATED STAND OF TIMBER OF MERCHANTABLE SIZE IN CANADA BY SPECIES

Species	Saw material	Pulpwood, fuel-wood, ties, poles, posts, etc.	Total
<i>Softwood</i>	1,000 cu. ft.	1,000 cu. ft.	1,000 cu. ft.
Spruce.....	25,264,715	44,783,154	70,047,869
Balsam fir.....	10,516,820	19,203,440	29,720,260
Jack pine.....	3,996,530	25,254,492	29,251,022
Cedar.....	17,979,240	4,065,761	22,045,001
Douglas fir.....	16,512,600	374,400	16,887,000
Hemlock.....	14,879,518	1,265,136	16,144,654
White pine.....	3,827,025	4,559,958	8,386,983
Red pine.....	866,145	1,632,735	2,498,880
Larch.....	732,115	710,184	1,442,299
Western yellow pine.....	876,000	117,000	993,000
Yellow cypress.....	876,000	117,000	993,000
Total.....	96,326,708	102,083,260	198,409,968
<i>Hardwood</i>			
Poplar.....	3,234,630	26,315,480	29,550,110
White birch.....	1,188,045	5,599,100	6,787,145
Yellow birch.....	2,278,695	3,003,550	5,282,245
Maple.....	1,359,114	2,671,125	4,030,240
Beech.....	401,979	741,734	1,143,713
Basswood.....	242,214	302,100	544,314
Elm.....	195,786	235,298	431,083
Ash.....	120,669	213,250	333,919
Cottonwood.....	172,572		172,572
Oak.....	43,143	58,330	101,473
Alder.....		4,750	4,750
Total.....	9,236,847	39,144,717	48,381,564
Grand total.....	105,563,555	141,227,977	246,791,532

TABLE VII (b)—ESTIMATED STAND OF TIMBER OF MERCHANTABLE SIZE IN CANADA BY REGIONS

Region	Saw material		Pulpwood, Cordwood, Posts, etc.	
<i>Softwood</i>	1,000 ft. B.M.	1,000 cu. ft.	1,000 cords	1,000 cu. ft.
Eastern Provinces.....	76,101,000	16,666,115	552,210	64,700,590
Prairie Provinces.....	17,985,000	3,938,715	272,010	31,825,170
British Columbia.....	345,762,000	75,721,878	47,500	5,557,500
Total.....	439,848,000	96,326,708	871,720	102,083,260
<i>Hardwood</i>				
Eastern Provinces.....	32,134,500	7,037,430	209,815	20,342,417
Prairie Provinces.....	9,305,000	2,037,795	196,010	18,620,950
British Columbia.....	788,000	172,572	2,160	205,200
Total.....	42,227,500	9,247,797	407,985	39,168,567
Grand total.....	482,075,500	105,574,505	1,279,705	141,251,827

In the first of these tables will be found an estimate of the total volume of balsam and spruce in the whole of Canada. Translating these figures into cords at 117 cubic feet of standing timber to the cord, we get approximately 383,000,000 cords of spruce and 146,000,000 cords of balsam, a total stand of 547,000,000 cords, or even less than the round figure of 580,000,000 cords suggested in the Association's statement laid before the Commission. In the same 1923 government document is to be found the following:—

TABLE I.—STATEMENT SHOWING THE TOTAL AREA OF FOREST AND THE PERCENTAGE OF THE LAND AREA COVERED BY FOREST

	Agricultural Land	Forest			Other lands	Total
		Merchant-able	Unprofit-able or inaccessible	Total		
	1	2	3	4	5	6
Square miles.....	431,700	456,800	739,125	1,195,925	1,975,711	3,603,336
Percentage of total area.....	12	13	20	33	55	100-00

Cols. 1, 2, 4 and 6—Estimates based on available information.

Cols. 3 and 5—Figures obtained by subtraction from total.

This shows that the unprofitable or inaccessible areas form a total of 62 per cent of the forest area. It is admitted that the density of growth in these areas—chiefly in the Hudson's Bay watershed—is much less than in the accessible areas. But in assuming that 500 million cords are on the 38 per cent of accessible forest land and only 80 million (or more accurately 47 million) on the 62 per cent of inaccessible, our statement assumes a density much more than ten times as great in the accessible as in the inaccessible lands, surely a very generous allowance, erring if at all on the side of deducting too little for inaccessibility. That this estimate of the accessible spruce and balsam in Canada is materially lower than that which prevailed until the 1923 survey embodied in the latest "Forests of Canada" may be admitted; it does not, however, seem to be desirable that forest industry should still be carried on and regulated exactly as if the old estimate were still reliable.

THE RATE OF REPRODUCTION

The rate of reproduction is another matter upon which scientific opinion has greatly changed in recent years. The official documents make practically no effort to estimate it; in the 1923 "Forests of Canada" the words "Not Available" appear under the headings: "estimated increment per square mile," "loss by fire," "loss by decay," "net increment," and every other heading in Table III. In the accompanying letterpress it is stated that "it should be possible to produce" a growth of ten to fifteen cubic feet per acre per annum, with adequate fire protection and general conservation, as an average for all trees and all areas in Canada. The lower of these rates, it is further stated, would give an annual yield of 7,500,000,000 cubic feet for the whole Canadian forest, which amounts to approximately 3 per cent of the standing merchantable timber as shown in Table VII. This is a very rough estimate, based on ideal conditions, and applying to large areas with a much higher growth rate than Eastern Canada, and to many varieties with a much higher growth rate than spruce. Thus one-third of the standing timber of Canada is in British Columbia, with a growth rate probably twice as high as that of Eastern Canada; and a large proportion of it is poplar and jackpine, which in any area are more rapid growers than spruce.

SESSIONAL PAPER No. 310

Lacking an official estimate for the growth rate of the important pulpwood trees in the chief pulpwood area, namely Eastern Canada, the best basis for an estimate would seem to be the observations of an experienced forester in that area. The Association's statement therefore quotes the estimate of such a forester, made since the 1920 pamphlet was published, and based upon very recent study of conditions. This estimate, of 1.22 per cent per annum, is that of Mr. Ellwood Wilson, chief forester of the Laurentide Company, Limited, who own or control approximately 3,500 square miles of timber lands, mostly in the St. Maurice Valley.

In support of this estimate Mr. Wilson submits the following:—

"We have just compiled some figures from studies made in all parts of the St. Maurice Valley, taking all of the white and black spruce and balsam. We find, taking all the trees standing on an acre in virgin forest from 4 inches breast height to 21 inches breast height diameter:

White spruce.....	329.6 cu. ft.
Black spruce.....	180 cu. ft.
Balsam.....	1200.9 cu. ft.

giving a grand total of 1710.5 cubic feet per acre. It took this wood about two hundred years to grow—taking an extremely low figure, let us say 170 years—this would give us an annual increment per acre of 10 cubic feet of solid wood, which would give .59 per cent per acre per annum as the rate of growth in virgin stands as established by nature, of white spruce, black spruce and balsam. No figures for rate of growth should be used unless they are referred to certain definite conditions.

"The figure of 1.22 per cent was calculated on the basis of the average tree. Neither of the figures which I give above can be applied to any other areas than the ones for which the averages were taken. The figure of .59 per cent can be used wherever a mature natural stand in the St. Maurice Valley is to be found. It is reasonable to suppose that practically all our virgin stands have come in after fires, therefore it would be safe to use .59 per cent in estimating the yield on lands just burnt or in process of natural regeneration, but not for jackpine lands or cut-over lands for the latter the figures so far obtained are meagre. As far as they go they indicate that the rate of growth will not be any better than the figure mentioned above."

In "Forest Resources of the World," by Raphael Zon and William N. Sparhawk, Forest Economists, Forest Service United States Department of Agriculture (McGraw-Hill Book Co., Inc., New York, 1923), some attention is paid to the subject of the annual forest increment. On p. 498 the total stand of Quebec's forests is given as 38,750,000,000 cubic feet; on p. 504, the net annual growth is given as 397,279,440 cubic feet, from which it is deduced that the net annual increment amounts to 1.02 per cent. The same authority (p. 498) gives the total stand of timber in Canada as 227,531 million cubic feet, the net annual growth (p. 504) at $2\frac{1}{2}$ or, more likely, 2 billion cubic feet, which works out at 1.1 per cent on the $2\frac{1}{2}$ billion estimate and 0.88 per cent on the 2 billion estimate. The same authority (p. 528) gives the total stand of timber in the United States as 745,588,000,000 cubic feet and the net annual growth (p. 531) as 4,265,000,000 cubic feet, or a net annual increment of 0.57 per cent.

With these authorities before us, it would not appear that the figure 1.22 per cent, suggested by the Association, can be considered as an under-statement.

IMPORTATIONS OF PULP FROM EUROPE

As the question has been asked, whether the stoppage of export would not lead to increased American importation of pulp from Europe rather than to

14-15 GEORGE V, A. 1924

erection of plants in Canada, it may be pointed out that there are very important arguments in favour of American paper mills contracting for supplies of pulp from Canada rather than from Europe, when supplies from Canada are obtainable. The chief of these arguments is reliability and regularity of shipment, in normal times, at a known rate of transportation cost, as compared with the uncertainties of marine carriage. In the case of mills not near the seaboard but near the Canadian boundary, the geographical argument is also forcible.

The American pulp market is a competitive one between the domestic mills, Canada and the European countries. Prices of American pulp and Canadian pulp do not vary greatly, wage schedules and other costs being about on the same level in both countries. Competition is really between North America and Europe (mainly Scandinavia and Finland). These countries have the advantages of lower labour costs and, temporarily, at least, of depreciated exchanges. In addition they have had and still have, a very low freight rate owing to the slump in ocean traffic which has prevailed during the last two to three years. This is not likely to continue indefinitely. The figures of imports of sulphite pulp into the United States for the past three years give some idea of the greatly increased quantities coming in from Europe. These are as follows:—

Nine months 1923.....	349,867 tons
“ 1922.....	237,229 “
“ 1921.....	75,755 “

The actual production of sulphite pulp in the United States was less in 1922 than in 1920, being 1,257,240 tons compared with 1,494,989 tons, in spite of 1922 being a year of better business and larger production of paper than was 1920.

The loss of production of sulphite in the United States during 1921 and 1922 was partly due to the fact that the paper manufacturers were able to buy European pulp at prices cheaper than the American mills could afford to sell it; hence some of their mills ceased the manufacture of sulphite.

The dependence of the United States on other countries for sulphite is shown in the following:—

—	U.S. Production	Total Imports	Imports from Europe
1920.....	1,494,989	473,176	136,205
1921.....	1,045,900	327,309	162,378
1922.....	1,257,240	713,616	413,209

In other words the United States depended upon outside sources for 24 per cent of its supply in 1920, 24 per cent in 1921, and 36 per cent in 1922.

Of the total imports in 1920 Europe supplied 28 per cent, in 1921 practically 50 per cent, and in 1922 58 per cent.

The total supply in 1922 was almost exactly the same as in 1920 and yet Europe supplied 413,209 tons in 1922 compared with 136,205 tons in 1920. The only logical reason is that European prices must have been lower than the domestic prices.

UNITED STATES' IMPORTS OF WOOD PULP

The following statement gives particulars of the United States' imports of woodpulp from 1914 to 1922, inclusive, and shows their source:—

SESSIONAL PAPER No. 310

BLEACHED CHEMICAL PULP (FIGURES IN SHORT TONS)

From	1914	1915	1916	1917	1918	1919	1920	1921	1922
Finland.....	411					1,095	9,424	10,114	11,349
Germany.....	23,250	5,266					584	2,451	3,888
Norway.....	63,027	39,301	31,837	17,759	1,344	5,998	17,416	9,748	45,148
Sweden.....	25,343	14,808	12,328	13,180	112	5,464	15,712	9,523	57,789
All other.....	3,277	297	89		412	27	3,160	2,723	4,788
Total other.....	115,308	59,672	44,254	30,939	1,868	12,584	46,296	34,848	122,962
Canada.....	11,603	10,808	8,688	12,918	18,647	35,315	101,216	66,341	136,589
Total Imports.....	126,911	70,480	52,942	43,857	20,515	47,899	147,512	101,189	259,551

UNBLEACHED CHEMICAL PULP (FIGURES IN SHORT TONS)

From	1914	1915	1916	1917	1918	1919	1920	1921	1922
Finland.....	1,229	2,855	896			14,231	20,262	33,662	52,118
Germany.....	44,931	13,535					5,488	14,984	20,691
Norway.....	52,206	27,267	13,463	8,378	4,406	6,556	7,062	6,794	41,190
Sweden.....	126,881	136,884	159,551	131,347	672	80,111	132,027	143,403	345,934
All other.....	7,368	979	197	475	562	2,215	5,443	8,588	4,988
Total other.....	232,615	181,520	174,107	140,200	5,640	103,113	170,282	207,431	464,921
Canada.....	97,601	130,801	194,116	214,312	366,536	282,795	355,767	199,140	317,856
Total imports.....	330,216	312,321	368,223	354,512	372,176	385,908	526,049	406,571	782,777

MECHANICAL PULP (FIGURES IN SHORT TONS)

From	1914	1915	1916	1917	1918	1919	1920	1921	1922
Finland.....	*	*	*	*	*	*	12,815	13,698	4,975
Germany.....	*	*	*	*	*	*	*	*	3,478
Norway.....	28	105	22	15,541			11,384	23,381	9,227
Sweden.....	155	28	190	2,468			7,074	17,233	6,366
All other.....	1,494	280	521	9,900	1,439	3,372	3,109	747	1,452
Total other.....	1,677	413	733	27,909	1,439	3,372	34,382	55,059	25,498
Canada.....	215,903	178,122	261,880	251,162	184,088	199,240	198,135	137,360	190,080
Total Imports.....	217,580	178,535	262,613	279,071	185,527	202,612	232,517	192,419	215,578

*Imports from Finland previous to 1920 included in "All other."

*Imports from Germany previous to 1922 included in "All other."

Figures from American Paper and Pulp Association.

COMPARATIVE PRICES OF IMPORTED AND DOMESTIC SULPHITE

Following is a list of prices taken from the Daily Mill Stock Reporter (New York) of date nearest to the first of the month. Imported prices refer to European pulp quoted ex dock. Domestic prices are f.o.b. producing mill. Prices are per 100 lbs. Domestic prices and Canadian prices are practically the same:

14-15 GEORGE V, A. 1924

	Unbleached Sulphite							
	1922				1923			
	Domestic		Imported		Domestic		Imported	
	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.
January.....					2 60	2 75	2 75	3 00
February.....					2 60	2 75	2 75	3 00
March.....					2 60	2 75	3 00	3 20
April.....					2 60	2 75	3 35	3 50
May.....					2 60	2 75	3 35	3 50
June.....					3 25	3 50	3 25	3 50
July.....					3 25	3 50	3 35	3 50
August.....	2 60	2 75	2 40	2 60	3 25	3 50	3 35	3 50
September.....	2 50	2 60	2 60	2 70	3 25	3 50	3 35	3 60
October.....	2 60	2 75	2 75	3 10	3 00	3 25	3 00	3 25
November.....	2 60	2 75	2 75	3 10	3 00	3 25	3 00	3 35
December.....	2 60	2 75	2 75	3 10				

To the Domestic prices must be added in each case the freight rate to New York which at present is about 34 cents per 100 lbs., having been reduced from 38 cents in July, 1922.

RELATIVE EFFICIENCY OF MILLS

In the course of our earlier argument it was suggested that many of the American mills now dependent on Canadian pulp or pulpwood to keep in operation are less efficient than the more modern mills operating in Canada. It was argued that in consequence of this condition Canadian pulp and paper manufacturers, looking solely to their own selfish interests, would be served better by a policy of *laissez faire*, than by one which would most probably result in bringing additional up-to-date mills to Canada to intensify competition. The statement was advanced as evidence of the Association's disinterestedness in the stand it has taken on the question of pulpwood exports. Counsel for the American interests took umbrage at this statement and challenged its accuracy.

No one questions that there are many efficient and up-to-date pulp and paper mills in the United States. On the other hand, no one familiar with the industry will question that the recent development of the industry has been greater in Canada than on the other side of the line and that, generally speaking, Canadian mills are newer and consequently more efficient than the older mills in the United States. Production of newsprint in Canada advanced from 415,000 tons in 1914 to 1,081,364 tons in 1922, or 160.6 per cent, while American production increased from 1,283,000 to 1,447,688 tons in the period, or 12.9 per cent. Production of chemical pulp in Canada increased from 289,776 tons in 1914 to 909,066 tons in 1922, or 213.7 per cent, while in the United States the increase was from 1,599,489 to 2,037,857 tons or 27.4 per cent. Production of mechanical pulp in Canada during the same years increased from 644,924 to 1,241,185 tons or 92.5 per cent, while in the States the increase was from 1,293,661 to 1,483,787 tons or 14.7. The greater increase in Canada was brought about by the erection here of new mills, embodying the latest developments and improvements not available to mills of prior construction.

A special United States Congressional Commission in 1908, and the Federal Trade Commission in 1918, both found that American newsprint mills operated at a disadvantage of \$5 per ton as compared with Canadian mills. It may be, of course, that this disadvantage is wholly accounted for by mills which have their own timber limits in the United States, and that the mills drawing from Canada are as up-to-date as the average Canadian mill, although this scarcely

SESSIONAL PAPER No. 310

appears probable, since in recent years the mere prospect of a possible embargo or export duty on Canadian pulpwood must have deterred any sensible American business man from erecting a mill dependent on Canadian supplies (unless in such a location and of such a kind that it could be readily removed to Canada).

The Commission is also referred to a report recently submitted to the bondholders of the American Writing Paper Company, by Mr. S. L. Wilson, receiver. This company owns and operates twenty-three paper mills, seventeen of which are located in Massachusetts, three in Ohio, three in Connecticut and one in Wisconsin. The receiver reports:—

“A physical examination of the plants was made by two men having experience with other companies of approximately twenty years. They reported that over half the plants were so out of condition that it would require a minimum expenditure of \$800,000 to put them in a condition in which the necessary quality of paper to compete successfully with other companies could be produced. For really efficient production a substantially larger amount should be expended in rehabilitating the plants.”

The question, however, as to which country has the more efficient mills has no direct bearing upon the matters now before the Commission, except as it may suggest that, other things being equal, the advantage in the pulp and paper industry lies with the country possessing a plentiful supply of pulpwood and cheap and adequate water-powers necessary for its conversion and that Canada's present advantage, in this respect, is being dissipated to a certain and grave extent by the practice of permitting the free exploitation of Canadian pulpwood by a competing foreign country.

THE EXPORTATION OF POPLAR

An attempt has been made to persuade the Commission that the bulk of the pulpwood now exported from Canada is poplar, a species admittedly in less demand in Canada than spruce or balsam, and that consequently no benefits would accrue to Canada by its suppression. The statement is a fallacy as the Commission can readily ascertain by inquiry at Canadian ports of egress, particularly in Quebec and Ontario. While it is true that poplar is not at present in great demand in Canada for the manufacture of pulp, the fact is, nevertheless, that the stoppage of the exportation of poplar would result in its increased demand in this country, as American soda pulp manufacturers would then find it to their advantage to establish mills on this side of the line. Out of an annual consumption of 5,500,000 cords in the United States, poplar constitutes only about half a million cords. This fact in itself refutes the statement made to the Commission that some 75 per cent of Canada's exports of pulpwood—amounting to from 1,000,000 to 1,500,000 cords a year—are comprised of poplar.

APPENDIX No. 2.

**MEMORANDUM ON BEHALF OF THE PULP AND PAPER
MANUFACTURERS OF THE UNITED STATES**

In submitting a memorandum on behalf of the Pulp and Paper Manufacturers of the United States it is proper at the outset to state that we do not propose to discuss the internal policy of the Dominion Government, either with respect to what it is or what it ought to be.

However, not only in fairness to themselves but in fairness to the Royal Commission and to the Dominion and Provincial Governments, who will have to determine the policy of Canada, the American manufacturers have, in view of their vast expenditures in the purchase and development of freehold land and leases in Canada, felt that they should place the facts before the Commission.

The United States, so far as the pulp and paper industry is concerned, imports forest products from Canada in three forms:

Newsprint and paper,

Wood pulp of various kinds,

Pulpwood ready to be manufactured into pulp.

So far as the first two of these forms are concerned, the United States market absorbs approximately four-fifths of Canada's pulp and paper shipments. (See, *Canada Natural Resources & Commerce*, p. 93, published at Ottawa, 1923, by the Department of the Interior, Canada.)

In this same publication, the Department says, page 91:—

“The pulp and paper industry, in fact, has been built upon trade abroad, and owes its exceptional advance in a large measure to the demands of the United States market with its high consumption of newsprint and other paper.”

The pulp and paper exports, four-fifths of which are absorbed by the United States have increased from \$8,975,000 in 1912 to \$105,450,000 in 1922 (see *Dominion Bureau Statistics*) and this record

“demonstrates the extent to which the pulp and paper industry has been responsible for the increase in Canada's total external trade” (page 91 same volume).

The other form in which the United States imports forest products from Canada is in pulpwood, and notwithstanding the “high consumption of newsprint and other paper” in the United States, the

“exportation of this raw pulpwood (from Canada) has remained practically constant since 1916, while the quantity consumed in domestic manufacture has increased since 1912 by over 300 per cent.” (Page 92.)

This constant figure which has gone exclusively to the United States is annually about 1,000,000 cords, (page 93).

SOURCES OF THE UNITED STATES IMPORTATION OF PULPWOOD

In considering this phase of the matter it is proper to note that it has been the long settled policy of Canada to keep the bulk of the forest land in public ownership. The result has been that for the Dominion as a whole about ninety

SESSIONAL PAPER No. 310

per cent of the forest area is publicly owned or Crown lands and in the Province of Quebec where most of the wood which is exported to the United States comes from, ninety-four per cent of the forest area is Crown land. (See Kellogg Pulpwood and Wood Pulp in North America, page 170.)

It therefore appears that the approximately 1,000,000 cords which have been exported yearly comes from less than ten per cent of the forest area for the reason that in practically all Provinces there is a prohibition against the export of wood from Crown lands.

This wood therefore comes from lands of farmers and settlers or from lands owned in freehold by manufacturers in the United States or from leases which have been granted by owners in Canada to manufacturers in the United States.

The United States manufacturers, for the purpose of determining what proportion of the wood came from the lands of settlers and farmers, circularized the entire industry in the United States with a questionnaire asking for the amount of wood imported by each mill and where that wood came from. One hundred and twenty-four replies were received, 71 of which reported importations of wood. These 71 mills reported total importations for 1921 of 891,489 cords and for 1922, 965,019 cords. It appears in the Preliminary Report on the Pulp and Paper Industry in Canada for these respective years, issued by the Forest Products Branch, Dominion Bureau of Statistics, that in 1921 the total exports of pulpwood from Canada was 1,092,553.

It therefore appears that the reports from the 71 companies cover substantially the importations and are sufficient to base statistics upon.

Of the total reported in 1921, 891,489 cords by these 71 companies, 694,629 cords came from the lands of farmers and settlers and 196,860 from other lands in Canada, and of the total in 1922, 965,019 cords, 702,342 cords came from the lands of farmers and settlers and 262,677 cords from other lands in Canada.

At the time the legislation was up in the House of Commons and the Premier was asking for the adoption of the bill which would authorize the Governor in Council to place an embargo on the exportation of pulpwood, he stated that the lands of farmers and settlers would be exempted from the embargo should one be decreed. This would mean that, for instance, in 1921 more than 694,629 cords of the total export of 1,092,553 cords would be exempted and in 1922 more than 702,342 cords of the 1,011,332 cords total amount exported would be exempted.

For the purpose of illustration take the last table of "Annual Utilization" of the Canadian Forests which is for the year 1920, being from 1921 census and the last table available. (Forests of Canada, page 35.)

It is pointed out that in 1920 both the quantities and values of the principal products were higher than normal.

Reduced to cords, the total cordage used, according to this official authority for all purposes was 22,731,743 cords. Of this total utilization 4,024,826 or 17.7 per cent was used for pulpwood. Canada used 2,777,422 cords of pulpwood or 12.2 per cent of the total lumber cut in her own mills. Canada exported from the lands of farmers and settlers 875,104 cords of pulpwood or 3.8 per cent of the total lumber cut, and 372,300 cords of pulpwood or 1.7 per cent of the total lumber cut from lands of operators or lands owned or leased by manufacturers in the United States.

If, therefore, farmers' and settlers' lands were not exempted an embargo as proposed would affect $5\frac{1}{2}$ per cent of the total annual wood and lumber cut in Canada and if farmers' lands were exempted an embargo would affect 1.7 per cent of the total lumber cut.

This statement would have to be modified, however, for since the bill authorizing an embargo was passed, an Order in Council has been issued which exempts from the operation of any embargo that may be imposed any contract

made prior to June 15, 1923 for a period of ten years. Just how much wood this would cover it is not possible to say, but it is safe to estimate that it would reduce the percentage of the total wood cut that the embargo would apply to 1 per cent or less than 1 per cent and in cords to around 100,000 to 150,000 cords per year.

From the standpoint of conservation of forest resources, the embargo would therefore seem to be absolutely useless.

There have been a great many loose statements made in connection with the supply of pulpwood from the conservation measure, to the effect that unless an embargo is put on the supply will be exhausted in from five to ten years. It is obvious that these statements are without any foundation in fact, in view of the fact that at least ninety per cent of the forest area in Canada is what is known as Crown land from which there is prohibition from exportation in practically every province.

We call attention on this same line to Kellogg on Pulpwood and Wood Pulp in America, page 157, where he states:—

“Were there to be no increase over the present rate in the cut of softwood for pulp and lumber in Quebec and were all the estimated stand of 360 million cords accessible, the supply would last for 100 years if it were not reduced by fire, storm or insects. On the other hand, much publicity has been given to a statement that the available supply of timber in Eastern Canada will be exhausted in ten years. It is sufficiently obvious that neither of these conditions will occur.”

CANADIAN INDUSTRIAL DEVELOPMENT

It has been suggested that the placing of an embargo upon the exportation of pulpwood would result in mills from the United States moving immediately to Canada.

In a paper prepared by the Canadian Pulp and Paper Association called, *Canada's Forest Resources*, the author glibly says, page 19:—

“It is generally conceded that another consequence (of embargo) would be that American concerns, now *more or less* dependent upon Canada for their pulpwood, and who control forest area here, either under leases or in fee, in addition to being forced into making greater use of their American resources, would immediately proceed to build pulp mills in Canada in order to grind their wood here and export it in the form of pulp.”

It not only is not conceded, but an examination into the facts and conditions is a complete refutation of the suggestion.

It is not contended that American capital may not invest in Canadian mills in the future. As in the past where due to the tremendously increased consumption of paper in the United States, pulp and paper mills have been established both in Canada and in the United States to supply the demand; so in the future pulp and paper mills will be established in the United States and in Canada whenever proper sites can be found and proper conditions exist, but the growth of this industry will be the result of economic laws and not the result of statute law.

There were in the United States in 1919 (and this condition is probably about the same now) 61 mills manufacturing pulp only, 497 mills manufacturing paper only and 171 mills manufacturing both pulp and paper, with a total investment of \$905,794,583. (Kellogg, page 223).

In order to locate a ground wood pulp mill there must be cheap power in large amount and these plants are always located where water-power developments are possible. (Kellogg, page 21).

SESSIONAL PAPER No. 310

It is usually figured that as a safe minimum a ground wood plant should be provided with a water-power development of at least 75-horsepower per ton of daily output, or that a mill of 100 ton daily capacity, which would be an economic minimum to justify an investment for the manufacture of pulp alone to supply a paper mill should have access to a dependable supply of 7,500 h.p. Such a plant including cost of power development but not timber supply, might easily cost \$800,000 or \$8,000 per ton of daily capacity. On the other hand, a chemical mill for the manufacture of sulphite pulp, while it would take much less power, would cost much more than the ground wood mill, namely for a 100-ton mill manufacturing unbleached sulphite, two to two and a half million or twenty to twenty-five thousand dollars a ton, and for bleached sulphite, three to three and a half million or thirty to thirty-five thousand dollars per ton.

That then is the problem which would face anybody contemplating the establishment of a pulp mill, and in addition to that he must find the necessary wood supply to justify the investment in the mill and water-power. A ground wood mill of 100 tons a day would have to have the equivalent of 100,000 acres of well-stocked growing forest which might mean very much in excess of 100,000 actual acres in order to yield steadily the amount of wood needed. A sulphite mill would require a tract at least twice as large. If it had to purchase these limits the ultimate investment, including improvements, etc., might easily be \$5,000,000, making a total investment of from \$6,000,000 to \$9,000,000. (Kellogg, page 3.)

In considering the question of whether the United States manufacturers would move their mills to Canada it must be borne in mind that the manufacturers who it is thought would move their mills have already made very large investments in mills, water-powers, timber limits and equipment in the United States. It is safe to assume that those manufacturers have in all probability expended as much money for equipping and building their mills and their water-powers as it would cost them to do the same in Canada. The moving of their mills to Canada would therefore either involve the scrapping of their large investments in the United States or duplicating a part or all of them in Canada. Furthermore, the large investment involved in establishing a new mill, for instance, for the purpose of making pulp to export to the United States for a large self-contained mill which already has a pulp mill in the United States would make the investment so tremendous and overhead so large that the amount of paper that the mill would be able to produce would not be sufficient to pay the overhead on the total investment. A mill in this condition not being permitted to use its Canadian limits would use its present limits in the United States and acquire other limits in the United States, which supplemented by the amount of pulp now imported from Canada and from Scandinavian countries (imports from the European countries are increasing rapidly each year) would have sufficient raw material for an indefinite time, or in any event for a sufficiently long time to make other arrangements to allow it to use its investment already made.

Mills will be established in Canada either with Canadian or United States capital when business conditions warrant such investment and not otherwise.

The United States Department of Agriculture is now making a survey on behalf of the pulp interests of the United States which indicates large pulpwood reserves in Alaska, in the states of the Pacific coast, in the Rockies and in the southern states. These reserves have hardly been touched due to the fact that the industry has been concentrated. The preliminary survey indicates that there is sufficient raw material in the United States by the additional

use of hardwood by new pulping processes and proper fire protection, careful cutting, reforestation, greater use of waste paper, co-ordination with lumber industries, utilization of lumber waste and the elimination of waste in manufacture, to not only take care of the present requirements of the industry but to take care of any probable increase.

The suggestion that American mills would move to Canada is prompted by the suggestion that the raw materials in Canada should be manufactured into the finished product in Canada. It has been suggested at some of the hearings of the Commission if the wood should be manufactured into pulp in Canada why not the pulp manufactured into paper in Canada and even carried to a greater extent? Up to two years ago American manufacturers were purchasing freehold land in Canada after making inquiries as to their rights to export the pulpwood cut therefrom and being assured that there was no law and no law suggested that would prohibit the exportation of pulpwood from freehold lands. Is it fair to assume that in the face of the suggestion at present made of an embargo, on pulpwood, that American manufacturers would move a pulpwood mill to Canada with the idea that they could export their pulp to their mills in the United States for the manufacture into paper, when it is even now suggested that pulp is a raw material and should also be manufactured into finished product in Canada, and it may be only a question of a short time when the American manufacturer would be faced with the proposition that he cannot export his pulp to his paper mill in the United States and must therefore move his paper mill also? In other words, practically a scrapping of his entire plant and investment in the United States. If the American manufacturer had moved his pulpwood mill to Canada and made the tremendous investment necessary for the purpose of establishing the mill, purchasing his water-power and timber limits for the operation of that mill, he would be in a position where he would be very much more easily coerced into moving his paper mill to Canada than at the present time when it is possible for him to get a supply in the United States either in the Eastern or Western part thereof or from Alaska.

There are, of course, many points in the United States where the pulp and paper industry has not been developed and it is fair to assume that if mills were to be compelled to move due to the lack of raw material supply in any particular section that they would move to such places as they could be assured would guarantee them a sufficient supply to operate without governmental interference.

The foregoing is a general discussion of the situation with reference to the probability of an embargo necessitating the removal of mills to Canada and it is perhaps proper to call attention to specific cases of United States manufacturers and to the conditions attaching to those cases.

St. Croix Paper Company.

This company is a Maine corporation with its mill located at Woodland, Maine, on the American side of the international boundary of the St. Croix river. The company was organized in 1904 and at that time procured by purchase some 200,000 acres of timber lands which has since been increased to 350,000 acres. All of this land is in the watershed of the St. Croix river, approximately 176,000 acres being on the Canadian side of the International boundary.

The company owns several water-powers on the St. Croix and under special act of the Dominion of Canada, parliament has developed about 20,000 h.p. and maintains large reservoir capacity which is of material benefit to powers on the river below their developments, most of which are on the Canadian side of the boundary.

SESSIONAL PAPER No. 1310

The actual investment in Canada is in excess of seven million dollars, of which one and one-half million is represented by bonds secured by mortgage on both Canadian and American timber land.

The company purchased its holdings in Canada largely from Canadian citizens relying on its right to cut the wood therefrom for use in its mills. It has paid taxes on the land for many years; has disbursed millions of dollars to Canadian citizens in wages and under contracts. The company as already stated has large holdings in Maine and the result of an embargo on pulpwood, so far as this company is concerned, would be that for a long period of time, unless its groundwood mill which is in good condition required replacement, its wood would be cut or purchased from the American side. It is possible that when the ground wood mill required replacement it might move across the river and use its Canadian lumber. This would be the case in any event and an embargo would not affect the situation. So far as Canada and its citizens are concerned, the result of an embargo would be that for a number of years the Canadian owners of pulpwood in the St. Croix valley and vicinity would have an unsettled market. Most of the wood naturally tributary to the company's plant is located within a radius of eighty miles and is delivered at the mill either by floating down the St. Croix River or by rail from Milltown. The nearest plant of any size in New Brunswick is located at considerable distance and would have a long rail haul for any part of the wood.

It is obvious that the Canadian owner of wood in this locality would be placed at a disadvantage for a considerable period of time and the only possible benefit to Canadian citizens would come in the remote possibility of the establishment of a groundwood mill which would require the employment of about twenty-five men, twelve of whom would be employed regularly inside and the balance handling wood would be employed intermittently.

Pejebscot Paper Company

This company is a Maine corporation, the plant of which is situated near the mouth of the Androscoggin River. Has a yearly capacity of about 47,000 tons of paper. This Company owns 67,000 acres of pulpwood lands on the South shore of the Province of New Brunswick bordering on the Bay of Fundy. The major portion of these lands was acquired by this Company or companies of which the Pejepscoot was a consolidation about twenty years ago. This company also owns in fee approximately 35,000 acres of land in the vicinity of Cookshire, Province of Quebec. The Company also purchases wood from farmers and other small holders in the vicinity of its woodlands.

These lands were acquired as a permanent supply for its manufacturing plant. The Company in order to unify the operation of its woodlands with its plant in Maine has constructed and put in operation a complete Ocean going fleet of barges and tugs to convey its pulpwood from New Brunswick to Maine. It has erected wharves and complete loading and unloading dockage facilities in New Brunswick and Maine and storage facilities in New Brunswick and Maine. It has also constructed numerous permanent dams on various streams leading to its loading points in the Bay of Fundy, in order to control the inadequate supply of water during the log driving period. The company has also as an adjunct to its manufacturing operations, built a substantial townsite at Great Salmon River with school and other facilities and gives employment to from three to five hundred men, many of whom have their permanent homes there. In establishing this unified operation the company has expended very large sums of money relying upon a continuous and permanent operation. Were the Pejepscoot Paper Company to be prohibited from using its supply of wood from its Canadian sources, acquired twenty years ago, for this particular purpose, it

would most seriously jeopardize if not destroy the large investment which this Company has made in Canadian lands and improvements. Such an act would in effect be the arbitrary seizure of private property justified, if at all, through the exercise of the absolute power vested in the Canadian Government, a power so infrequently to be exercised and so severe in its operation that only the direct necessity would invoke it. The holdings in New Brunswick are situated on a narrow watershed extending along the South shore of the Bay of Fundy. The property extends backward from the Bay to the Divide which does not exceed 15 miles in depth. The pulpwood on this property cannot be moved over the divide and the natural and only economical outlet is by water transportation to the point of manufacture. The depth of the watershed is too limited to provide water storage sufficient to produce reliable and continuous power to operate a mill in this locality. The Company has been required to employ gasoline engines to operate the conveyor mechanism at its chief loading station in New Brunswick. The Company could not move its manufacturing plant to these woodlands or to the Quebec woodlands not only on account of the lack of power, restricted producing area, but because the removal of a complete manufacturing plant such as this company would mean virtually the scrapping of the plant representing an investment of several millions.

This company has so cut its wood on its New Brunswick holding that for a period of twenty years operation the wood has not only not been depleted but the property contains a greater stumpage than at the time of their acquisition. This company has conducted the most scientific and far reaching conservation and reforestation programme of any company, Canadian or American, known. It has regulated its cutting operations; has been careful to minimize fire risks by burning slash along public highways; by building roads and telephone lines through its property and maintaining lookout stations, portable gasoline pumps for fire hose, etc.

Dr. C. D. Howe, President of the Canadian Forestry Association, in a letter dated August 26, 1923, after visiting this property with the delegates of the British Empire Forestry Conference, said,—

“The delegates regard your company the most far sighted of any they have met in the work it is doing to place its operations on a long time basis.”

Oxford Paper Company.

This company is a Maine corporation with its plant at Rumford, Maine. This company has acquired through leases very large timber limits and rights in the Province of Quebec and Nova Scotia, Canada. In Quebec the company holds a lease, aside from its Crown leases, of approximately 88,000 square miles from the Seminary. This lease was originally granted to Maurice Quinn, a citizen of the United States of Saginaw, Michigan, on the 19th day of October, 1909 for a period of fifteen years from November 1, 1909, with the privilege of an additional period of ten years, which privilege was exercised so that this lease runs until 1934. The Oxford Paper Company acquired this lease for approximately \$98,000, and has invested in mills, river and dam improvements, dams, etc. for the purpose of operating these limits approximately \$200,000. The Company pays to the Seminary a fixed sum per year plus a sum for each cord cut. The lease gives to the lessee the exclusive right to use and enjoy said lands with the exception of those sold for farming purposes as therein mentioned and to cut therefrom spruce, balsam and any other pulpwood. The lease requires that the lessee shall cut each year at least 3,500 cords and failing to do so shall pay the Seminary the stumpage on that amount.

SESSIONAL PAPER No. 310

This company also holds a lease at Cape Breton, Nova Scotia, covering approximately 1,015 square miles. It was originally granted by the Crown (Province of Nova Scotia) in 1898 to Daniel F. Emery, Edwin L. Sanborn and Robert B. Blodgett. The lease originally contained a provision against the export of pulpwood and within a year the lessees came back to the Government and pointed out the impracticability of handling the lease if they were prohibited from exporting pulpwood. In 1900 the Government of Nova Scotia passed an Order in Council advisedly and deliberately and after consideration, providing that wood could be exported after it were shaved or peeled. In 1905, in the House of Assembly of Nova Scotia, the matter of the legality of the lease having come up because of the fact that there was no express power given to the Governor in Council to alter it, the Premier stated that if he apprehended that there was any violation of the law that would void the contract he would soon have the contract legalized, and in 1913 the law officers of the Crown to whom the whole matter was referred, recommended to cancel the lease which was subject to the Order in Council and make a new lease, which was done and approved by the act of the Assembly, and that lease contained a provision that,—

“Provided that all wood cut and barked roused or hand peeled, ready for being made into pulp shall for the purpose of this lease be considered as manufactured lumber.”

This lease was made as stated in 1913 under the amended Crown Lands Act of 1910. In 1914, a year after the lease was made the whole matter was brought to the attention of the House of Assembly and was subject to debate. In 1915, the lease came up for revision by an express bill and there was a debate on this lease and the Premier at that time said:—

“It should not be forgotten that the lessees had paid to the Government \$100,000. in the shape of rental and up to date they had never got a dollar out of it.”

A bill was passed (Chap. 84 of the Statutes of Nova Scotia, 1915) approving this lease, the terms of which were embodied in the Act of the Legislature and the bill provided that “said lease agreement made as aforesaid the 19th day of June in the year of our Lord, one thousand nine hundred and thirteen, in substitution for said lease so surrendered as aforesaid is hereby declared to be in all respects a legal and valid lease according to the terms thereof, which terms are declared to be binding on the parties thereto in all respects according to the tenor of the same.”

This was the condition of this lease in 1917 at the time it was presented to the Cape Breton Pulp and Paper Company, Limited, by Mr. F. J. D. Barnjum, at that time a part owner of the lease. This company, relying upon the terms of this lease and the acts of the legislature of Nova Scotia purchased the lease with the consent of the Government and subsequently the Oxford Paper Company took over the lease from the Cape Breton Pulp and Paper Company assuming all its liabilities including \$777,000 in principal amount of bonds then outstanding secured only by property rights covered by said lease. This company since they took over the property have expended from a million dollars to a million and a quarter in actual money in putting the property in shape to operate, in the shape of dams, fire towers, mill construction and lading facilities. They started operations in 1917; the payrolls run from a minimum of approximately \$65,000 a year to a maximum of approximately \$613,000. The company employs approximately 750 men. The average expenditure of the company for supplies which in part is expended locally as far as possible runs to approximately \$150,000 which means that the company distributes in the country from five to six hundred thousand dollars a year as

14-15 GEORGE V, A. 1924

the result of their operations. Mr. Chisholm in testifying before the Commission at Halifax stated that the most conservative estimate that they had as to the amount of wood on the property was three million cords. The company cuts about 40,000 cords a year which would be 75 years' supply; that they are cutting the property in such shape that this would take them virtually around the property back to the point of starting at which time

"if the experts are at all correct we will not only have a complete net cutting to start from but a great deal more than that, because the wood grows pretty fast in that particular climate on account of the dampness and the moisture of the soil, etc."

Since this Company took over the property they have maintained fire patrol organized in conjunction with the Government; three fire towers have been erected. This company could not move its mill to those limits because of the climatic conditions, their port being closed five months in a year and it would be impossible to operate a pulp plant the size of the plant of this company making 300 tons of book paper a day at a point of location which is closed to transportation five months in the year. In addition to that they have invested in their mill property at Rumford, approximately fifteen million dollars, 50 per cent of which would be represented by bricks and mortar, piping, etc. By the time that they would have moved their big machines and paraphernalia which goes with them they would have spent half of the cost of them in moving, so that instead of having an investment of fifteen million there would be something like twenty-five million.

The Oxford Paper Company has had the Cape Breton property examined by the well known consulting engineer, Hardy S. Ferguson, for the purpose of seeing whether or not a mill could be constructed at Cape Breton, both a sulphite and sulphate or a combined sulphite and sulphate mill. The report made by Mr. Ferguson indicates that the capital investment required and the cost of manufacture, considering the difficulties which would be encountered, would be prohibitive. Such a plant would require facilities for storing pulp for six months in a year, which would have to be unbleached pulp as bleached sulphite would not keep that long. It would also require a storage capacity for four months' supplies of raw materials other than wood. The total cost of pulp including investment on the working capital required and on the capital investment for the plant, including storage facilities would at a conservative estimate for the unbleached sulphite pulp on steamer at Portland, Maine, be about \$72.20 per ton. The Oxford Paper Company would have no difficulty in purchasing unbleached sulphite pulp of the best grade for book paper from Scandinavian countries alongside wharves at Atlantic ports for from fifty to fifty-five dollars per ton, which would show an excessive cost to them of \$27.00 to \$22.00 per ton which would make the price of paper which they manufacture so high that they would not be able to compete with manufacturers making the same product. This shows the absolute impossibility of establishing a mill at Cape Breton.

International Paper Company.

This company is a corporation organized under the laws of New York, having plants in various localities both in the United States and Canada through its subsidiaries.

The company manufactures pulp and paper both in the United States and Canada. It has subsidiary companies with very large investments in plants manufacturing pulp and paper in Canada and also in the United States. In 1905 one of its subsidiary companies purchased 47,657 acres at Sheet Harbor, Nova Scotia, for approximately \$190,000. None of this property has been improved but it has been held as a pulp reserve.

SESSIONAL PAPER No. 310

In 1905, and in the course of the next few years, the Miramichi Lumber Company, a subsidiary of the International Paper Company in New Brunswick, purchased 193,449 acres of freehold in New Brunswick for which was paid a total sum of approximately \$680,000. In order to utilize the forest products on this tract the Company has expended approximately \$100,000 since its purchase in the construction of a rossing mill and river improvements. In 1907 and during the next few years the St. Maurice Lumber Company, a subsidiary of the International Paper Company in Quebec, purchased 82,631 acres of freehold land in that Province on St. Maurice River, on the Batiscan River and the Pentecost River and in the Gaspé Peninsula, for which the total sum of approximately \$470,000 was paid. The various plants, wood preparing mills, dams, piers, booms, jack works and other improvements necessary to operate these Quebec properties have actually cost the Company \$425,000 in addition to the cost of the land. In other words, the company has a total investment of approximately \$1,900,000 at prices actually paid. It is obvious that none of these purchases alone would justify the installation of a plant on the Canadian side and the Company already has large investments there. Imposing an embargo so that the company would not be able to use the wood on their freehold land would not only result in a practical confiscation of the property of the company so far as this use is concerned but would result in very serious loss to the Company both in its American and Canadian operations.

Penobscot Development Company.

This is a company organized under the laws of the State of Maine, a subsidiary of the Penobscot Chemical Fibre Company, located at Old Town, Maine. In 1917, the Penobscot Development Company obtained a ten year permit from the Pokiok Land and Water Company, Ltd., a Canadian corporation, to cut pulpwood off lands at Pokiok in the Province of New Brunswick. Under this permit the company is obliged to cut during the next five years 5,000 cords a year at \$2.00 a cord. An embargo would necessitate a payment of \$50,000 without any return to the company. This company has spent on this land approximately \$5,000 in improvements and approximately \$250,000 in operating expenses. Of this one-quarter has gone to the Canadian railroads, three-eighths to Canadian labour, three-eighths to the Canadian supply dealer.

In January, 1921, this company bought 4,614 acres of land in St. James Parish, Charlotte County, New Brunswick, for \$10,000. Nothing has yet been cut on these lands, the purchases being made solely for the purpose of supplying the Penobscot Chemical Fibre Company with pulpwood in its mills in Maine. These purchases were made on the understanding that there was no law prohibiting the export of wood into the United States from freehold land. This company at the present time owns and controls in the United States enough timber land to supply its parent company with spruce for 38 years. The company also owns or controls in Maine enough poplar to supply the parent company for at least five years. It is obvious that this company has sufficient limits and has ample supply in Maine to prevent it from considering any move.

Hollingsworth & Whitney, Ltd.

This company is organized under the laws of the State of Massachusetts with pulp and paper mills in Maine. This company owns in fee 300,000 acres in Nova Scotia and about 50,000 acres in New Brunswick. They have made no attempt to use these lands. They were purchased from Canadian citizens 200,000 of the same being purchased from the Bank of Montreal, receiver of the Davison Lumber and Manufacturing Company. These purchases were recently made, prior to any talk of an embargo. The reason that this company has not

used any of its Canadian limits is that it has been very busy cutting wood in Maine destroyed by the budworm. From their limits in the United States this company has sufficient pulpwood to last them from fifteen to twenty years. The investment in freehold land in Canada which was purchased in 1922 was for between two and three million of dollars. The purchases were made after careful inquiry from persons highly situated in the Government of Nova Scotia and New Brunswick as to the possibility of any embargo and were assured that this could not be feared. This company could not put a mechanical pulp mill in Canada as there is not sufficient power on any of the property or in any locality sufficiently near to their limits.

S. D. Warren & Co.

This company is organized under the laws of the State of Massachusetts. This company owns limits in Nova Scotia, about 67,000 acres, for which it paid approximately \$400,000. No wood has been taken from those limits and no expenditures made with the exception of about \$5,000 a year which has been expended for the purpose of fire protection. The probabilities are that this limit will not be used for four or five years. This company owns very large timber reserves in the United States and could get along without using the Canadian limits and by depending exclusively upon its United States sources for eighteen to twenty years. An embargo in this case would be practically a confiscation of this property because the company could not move its mills to their limits in Nova Scotia as there is no water-power available; Nova Scotia coal would not be an economical substitute on account of its price and quality; the timber limits are too small to justify the building of a pulp mill of sufficient size to be economically operated and there are not sufficiently large limits within reasonable proximity to be added to the company's present holdings. This company would fear also that if the principle of an embargo is adopted compelling the manufacture of pulp in Canada it would be followed by the compelling of the manufacture of paper in Canada.

Bayless Pulp and Paper Company.

This company is a corporation organized and existing under the laws of the State of New York and maintains a plant at Austin, Pennsylvania. This company owns properties consisting of about 350 square miles of which 92 miles are Government limits and the balance freehold land. This property comprises the watershed of the St. Ann River and is located about 21 miles from the City of Quebec. The property was purchased in 1905. The company has at Baupre a very fine receiving pond and wood preparing plant as well as a short railroad. On this property the company maintains telephones and various camps, roads practically to the back of the property, and the streams have been put in excellent driving shape by the construction of dams and otherwise. The company has invested approximately for these river and camp improvements, etc., and in putting the property in shape \$450,000. During the years from 1905 to 1923, the company has only taken from this land 161,842 cords of wood. In 1922-1923, 3,126 cords; in 1921-1922, 3,436 cords, and in 1920-1921, 21,222 cords. The number of men employed is approximately 300 men from September 15th to May 15th and from May 15th to September 15th about 125 men. The wood which the company has taken from these limits has been exported to their mill at Austin, Pennsylvania. The company in the purchase of this property and development has invested approximately \$1,000,000. The property was originally purchased with the idea of supplying the plant at Austin with pulpwood. It was purchased in 1905 long before any question was ever suggested even of an embargo on Crown Lands. The company certainly would not have made this

SESSIONAL PAPER No. 310

investment had it had any idea that there would have been at any time any legislation which would interfere with its rights as a freehold land owner to cut and do with the wood as it desired. The company by its telephone lines and operations has been careful of all fire risks and has conserved this property as appears by the number of cords which have been taken off from 1905 to 1923.

The foregoing shows the condition of a few of the United States companies operating in Canada and is sufficient to show the tremendous investment of United States capital both in leases and in freehold lands and in the improvements of lands and rivers in Canada. The greater proportion of the investments were made long prior to the talk of any embargo and as far as twenty years back, in good faith, and the operation has been in co-operation with the Government and in accordance with the best interests of the forests and the operation of the mills.

While it is conceded that the Canadian Government, either Provincial or Dominion, has the absolute power to make such regulations as it sees fit with reference to its natural resources, it is confidently submitted that no such drastic action would be taken by either the Dominion or Provincial Government as an embargo on the exportation of pulpwood from freehold lands.

Such an embargo would affect only a small portion of the forest area of Canada, namely ten or less than ten per cent of the total forest area;

If the farmers were exempted as promised by the Premier it would affect less than $1\frac{7}{10}$ per cent of the total amount of lumber cut in Canada;

It would amount to a practical confiscation of the property and contract rights of freehold owners of lands and leases, the purchases and improvements on which were made in good faith long before action of this kind was taken; and

So far as leases from the Government of Nova Scotia to any of the American companies, approved by the Legislature, are concerned, would amount to the same thing as the repudiation of a bond issued by Act of the said Legislature.

MONTREAL, March 28, 1924.

AIME GÉOFFRION,
*Attorney for The Pulp and Paper
Manufacturers of the United States.*

APPENDIX No. 3

THE PULPWOOD EMBARGO

MEMORANDUM OF THE CANADIAN PULPWOOD ASSOCIATION

FOR SUBMISSION TO THE ROYAL COMMISSION ON PULPWOOD

OTTAWA, May, 1924.

This Memorandum deals with the proposal to embargo pulpwood cut from privately owned lands. The plan of the Memorandum is:—

First—To test the two main reasons advanced for the embargo, namely: “Conservation” (Part I), and “Industrial Development” (Part II).

Second—To state some of the reasons which are directly opposed to the experiment (Part III).

PART I.—THE CONSERVATION ARGUMENT

One of the two main reasons advanced in support of an embargo is that it will “conserve our wood resources.” It is proposed to test this argument. Will an embargo on pulpwood really conserve our forests?

1. *What True Conservation Means.*

“Conservation” does not mean “miserly hoarding” which deprives the present generation of its share of the country’s wealth and claims justification in a pious solicitude for “posterity.” Conservation of our forests means the same sort of prudent administration as sound business men use in dealing with their capital. It means sanity in handling our wood assets. It means discouraging waste and encouraging care, but it recognizes that natural resources are to be enjoyed, and that the laws of supply and demand and the rights of property are not to be lightly disregarded. “Conservation” is simply sound cutting, because if cutting is properly carried on, it promotes new growth and it saves timber which has reached maturity and will, if not cut, deteriorate and form a fire menace as well.

2. *A Pulpwood Operation Does Conserve.*

A pulpwood operation conserves by utilizing more of the raw material and creating less fire hazard, by reason of the fact that there is less top and slash left behind and what is left is practically flat on the ground.

This point came out very strongly in the New Brunswick evidence with regard to the economy resulting from taking the tops which would be too small for a lumber operation.

The saving which comes from being able to use burned and budworm killed wood, if a quick market is available, and the advantage in getting a revenue from the otherwise worthless poplar, has also obvious advantages.

3. *Economy of Pulpwood and Rough Lumber Operations Compared.*

If an embargo will “conserve” our wood resources, why limit the proposal to pulpwood? Why not include rough lumber? If conservation means avoiding waste of raw material then the lumber operation does the greater damage.

SESSIONAL PAPER No. 310

A rough lumber operation, carried on by itself, wastes approximately 50 per cent of the tree. An operation which combines rough lumber and pulpwood wastes only 15 per cent of the tree.

Incidentally if the tree must be exported as rough lumber, but not as pulpwood, then our railways lose 50 per cent in freight on account of the difference in weight between rough lumber and pulpwood made from the same quantity of raw material.

Although we are here discussing the relative "conservation" merits of pulpwood and lumber, another comparative feature may as well be noted, and it is one which is not generally realized; namely, that, taking an equal amount of raw product, there is as much money spent and as much and probably more labour required, in manufacturing it into peeled or rossed pulpwood than into rough lumber.

This is at least a strong indication that genuine conservation is not the thing which is really being sought. Conservation is only being stressed to provide an argument for an embargo on pulpwood.

4. *Futility of Embargo as Conservation Measure, When Only Negligible Quantity of Annual Wood Consumption is Affected.*

The relatively insignificant quantity of wood which could be affected shows how delusive as a "conservation" measure a pulpwood embargo would be.

It is neither exporting nor cutting which is threatening the Forests of Canada. It is estimated by advocates of the embargo that cutting accounts for only 10 per cent of our annual wood consumption, and that the remaining 90 per cent is destroyed by fire, wind, bugs, fungi, etc. Of this 10 per cent which is cut, one-twentieth is pulpwood which is exported. This means that under the mask of "Conservation" it is proposed to stop the export of one two hundredth, or one half of one per cent, of our total wood consumed, and, the burden of this spasm of conservation is to fall exclusively on wood which happens to have been manufactured in a rossing drum instead of a circular saw. Conservation thus limited is a misnomer.

EMBARGO NEVER CAN AFFECT MORE THAN TEN PER CENT OF CANADA'S PULPWOOD STAND

It may be said, however, that exports may increase and become in time an appreciable factor. Let us see therefore, what is the maximum proportion of our pulpwood which could be exported if there were no embargo. It is overlooked sometimes, that 80 to 85 per cent of the pulpwood of the four Eastern Provinces of Canada is now owned and controlled by the Governments and cannot be exported. This leaves 15 per cent privately owned, but of this 15 per cent it is fair to say that at least one third is owned by Canadian Pulp and Paper Companies and other Canadian wood using industries, who certainly would not export it as pulpwood, particularly in view of their strong antipathy to anyone else doing so. This leaves only 10 per cent of the pulpwood of Canada as the maximum which could ever be exported.

To sum up on this point, it is idle to talk of an embargo on pulpwood as a genuine conservation measure because (1) an embargo would only apply to about one twentieth of our annual forest cut; (2) an embargo would apply only to one two-hundredth part of our total annual wood consumption from all causes; (3) an embargo could never apply to more than ten per cent of our pulpwood stand, because that is the total extent of our privately owned wood available for export.

5. "Conservation" and "More Pulp Mills" are Contradictory.

The conservation argument is destroyed if the embargo will, as its advocates predict, result in a rush to establish American mills in Canada.

It is not by any means admitted that this forecast will come true, and the reasons for doubting its reliability are given elsewhere in this Memorandum, but if it were so, would not the tendency be to cut the wood much faster than in the past? At present the wood from Canada is simply supplementary to the American supply, and is drawn on as a reserve, but with the forced erection of mills is it not reasonable to expect an independent, vigorous and thoroughly exhaustive operation. The cost of the plant must be repaid. It cannot be allowed to stand idle, and intensive cutting will be the result. If it is answered that cutting restrictions could be added to the embargo, this only goes to show that the embargo is not effective as a conservation measure and that what is needed is improved forestry methods. Again, it is obvious that a simple restriction requiring that our wood be turned into pulp north—instead of south—of the 49th parallel, will not lessen the cutting, and even the strongest advocates of the embargo do not deny that there will be just as much cut under an embargo as without it, but it is said that we have the dismal comfort of the reflection that in this way Canadians will "at least reap the benefit of their own devastation." Admittedly, therefore, there is no hope of conservation in an embargo.

6. *Conservation Should Apply Particularly to the Ninety per cent now Destroyed by Fire, etc.*

Conservation is to be attained by natural and approved methods of practical forestry, rather than by artificial and unsound trade restrictions.

It is not the wood which is cut, but the wood which is wasted by lack of fire protection and by lack of sound forestry methods which depletes our resources. Attention has already been called to the estimate that nine times as much wood is destroyed by fire, wind, insects, etc., as is cut.

Following are quotations which put the situation succinctly and indicate the real menace and the real remedy—

"Cutting is a mere bagatelle compared with the incredible damage by fire, and in Eastern Canada, fire itself has been far outshone by the spruce budworm—between flames and forest insects we are due for a sharp reduction of the forest inventory."—(Can. Forestry Magazine, April, 1923).

"It is the business of scientific foresters and prudent forest statesmen to devise and carry out policies which will preserve this national estate without unduly hampering the activities of the lumbermen. The forest is made for man and there are idealists who would deprive the present generation of their legitimate share of these resources. As yet the danger of their propaganda is not grave. Influences in the other direction are sufficient to protect legitimate industry from excessive prudence. The annual crop of timber in European countries which preserve their forest capital is relatively large. If Canadian forests are guarded from fire, protected as far as possible from disease, and prudently harvested, they will undoubtedly afford an annual increase exceeding the present yearly product. Miserly hoarding may never be necessary if the same principles of prudent administration are applied to the forest as sound business men use in the protection of their capital."—(Vancouver Province, B.C., August 27, 1923).

Only to make it a matter of record and with no hope of suggesting anything which has the virtue of novelty, the following methods of practical and effective conservation are noted:

SESSIONAL PAPER No. 310

1. The dedication of absolute forest land to the permanent production of timber. This involves the classification of the land and the exclusion of settlement from lands which are essentially suitable for forest purposes.

2. The encouragement of the practice of forestry on private lands by the proper adjustment of taxation to meet the special needs of forest property and by furnishing advice and assistance in the establishment and care of the forests.

3. Increased fire protection.

(a) Regulations prohibiting going in the woods without license.

(b) Fire warning notices.

(c) Increased ground patrols.

(d) Tower and telephone alarm systems.

(e) Aircraft.

4. Regulated cutting according to some plan approved by such representative associations as the Canadian Society of Forest Engineers, the Canadian Forestry Association, the Canadian Pulp & Paper Association, the Canadian Lumbermen's Association and the Canadian Pulpwood Association.

5. A constant educational campaign, beginning in the schools, as to the duty and responsibility of the public respecting the conservation and protection of the Forests.

6. Greater effort in protecting and encouraging reproduction by natural seeding.

7. Governments to take full advantage of the opportunity afforded for consultation and co-operation with Committees of representative Forestry Associations such as those mentioned.

All these things have been repeatedly suggested and are admittedly sound. What is needed now is that public authorities take practical steps to bring such measures into effect and that those engaged in the industry bend every effort to see that they are carried out.

PART II.—THE INDUSTRIAL ARGUMENT

The other main reason given in support of the embargo is that it will "stimulate industrial development" by improving conditions for existing mills and by compelling the erection of mills by United States operators who buy wood in Canada, or who own lands here and who will be compelled to come North in order to get the benefit of their holdings.

As has been said the "Industrial" benefit and the "Conservation" benefit cannot both be enjoyed. One destroys the other.

1. *The Obvious Enquiry is: What Real Assurance have we that this New Industrial Era will Materialize?*

It is dogmatically asserted that United States manufacturers will be forced immediately to come to Canada, but those who assert this can only be indulging in the most insecure speculation. In economics what is apparently an obviously necessary result does not always follow, and the more seemingly clear the conclusion, the more likely to be proved wrong by some simple economic factor, the full effect of which has not been foreseen.

The suggestion is to literally force, by legislative enactment, the expenditure of money in Canada by citizens of the United States. The measure is based on

14-15 GEORGE V, A. 1924

the assumed needy condition of the United States as to wood resources. It is proposed to profit by that need. If we are going to take advantage of what we consider to be our neighbour's straitened circumstances to drive a shrewd bargain, we must be sure that we have made no mistake as to his resources.

The only thing which can be said positively is that no one can foretell what the effect will be.

To say that the United States operator will jump at the crack of the whip without taking careful stock of his resources and possibilities, is to delude ourselves. Even allowing nothing for growth, it is admitted that he has many years timber supply in sight in his own country and he can therefore, if necessary, carry on for a few years at least with wood from his own holdings. To arrogantly prognosticate that, in his endeavour to avoid the discomfort of this commercial thumbscrew, he will not adopt measures which will successfully husband his own resources, and that he will fail to work out methods to utilize woods not heretofore used, or even substitutes for wood, and that he cannot develop any other outside source of supply, is to give our neighbours credit for less initiative and resource, than we ourselves would expect to display under similar circumstances, and is also to be dangerously blind to the possibilities of science in industry as forecasted by the phenomenal achievements of the past two or three decades.

But supposing all these possibilities fail, the citizen of the United States who has lands in Canada still has four alternatives: (1) He may sell his land or wood to his Canadian competitor; (2) He may put his wood through a saw-mill and thus secure its passport to the United States; (3) He may build a mill and grind the wood, or (4) He may let it stand for an indefinite period.

In the meantime the Canadian timberland owner has been cut off from the most profitable market for *his* product and has had to sell (if he can sell at all) to one of the local mills at a price which would be reduced because there was no outside competition.

This then is at least fairly certain, that under an embargo there must be an indefinite but prolonged period of suspense and consequent depression in the wood business.

✓ 2. *Mills will be Established Naturally just as Fast as Conditions Warrant*

There is every economic reason for the manufacturer to locate his mill as near to the raw material as possible. The difference between the freight paid on pulpwood as such, as compared with the same quantity of pulpwood in the form of pulp or paper, has constituted an economic embargo for years.

Suitable pulp mill sites are not by any means readily found and this factor of location (together with those of financing, operation and market) far outweigh any trifling consideration as to whether or not the pulpwood from 10 per cent of our timber stand may go to the United States. An embargo will not induce mills which are not otherwise commercially feasible, nor will the absence of an embargo deter the erection of a mill where the active requisites for success are present.

To say that existing mills could not continue successful operations without an embargo would certainly be to confess the hopelessness of the prospect of attracting other establishments.

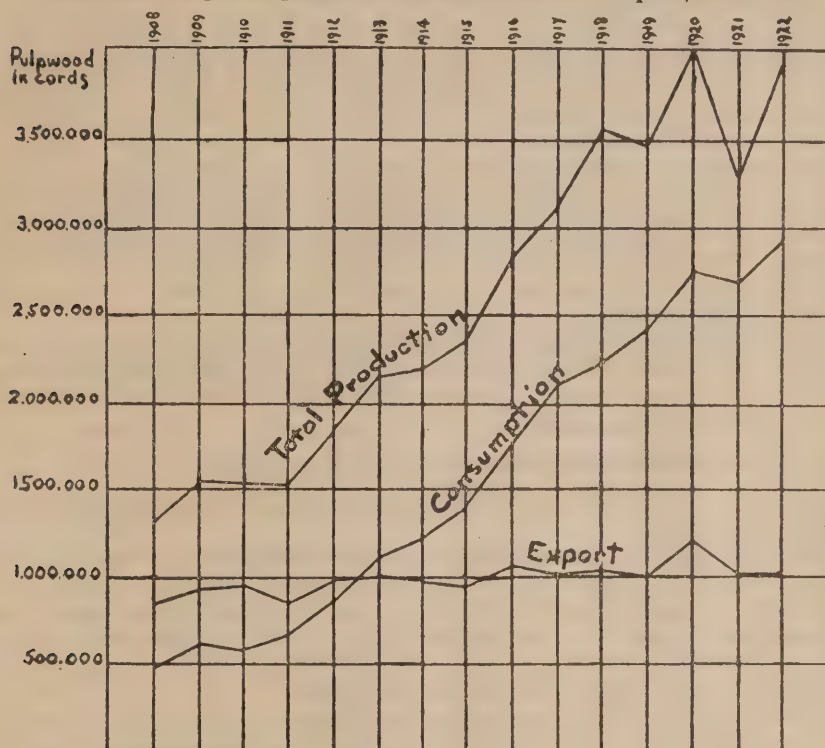
Events of the last two years have demonstrated that the business is already overdeveloped. It is not only futile to *expect* the establishment of more mills in Canada until the general commercial situation warrants it, but it is folly to talk of *forcing* such a development in the face of existing market conditions.

Under healthy conditions of competition the Canadian industry has made great strides in the past ten years. A statement made in the Canada Year Book (1922-23, p. 328) is as follows:—

SESSIONAL PAPER No. 310

"The exportation of raw pulpwood, as shown in the accompanying diagram, has remained practically constant since 1912, while the quantity consumed in Canadian pulp mills has increased by over 236 per cent during the same period. In 1908, almost two-thirds of the pulpwood cut in Canada was exported in the raw or unmanufactured form. In 1922, with an increase of almost 300 per cent in total production, the proportion exported has fallen to about one quarter."

Canadian Pulpwood production manufacture and export, 1908-1922



(Diagram referred to in quotation from Canada year book 1922-23)

THE SUGGESTED EXPORT TAX

There has been an alternative suggestion, that in lieu of an absolute prohibitory measure, Canada might adopt the expedient of an export tax.

An examination of the reasons against an embargo will make it clear that they apply relatively, with equal force, to an export tax. In addition to all these, however there is the very pertinent enquiry;—who will pay this tax, the American buyer or the Canadian producer? The following considerations indicate the answer:—

Canada does not control the price of wood in the United States. It is controlled, as all well-informed authorities admit, by three factors:— ✓

- The cost to American mills of producing wood from their own lands in the United States.
- The price of open-market wood in the United States.
- The price of Scandinavian and other foreign Pulps, delivered at New York.

Since the Canadian producer is not the arbiter of Pulpwood prices it follows inevitably that the imposition of an export tax will not increase the cost of Canadian wood to the American mills but will simply mean that out of the same price that the Canadian now receives, or would receive at any other time, he will have to pay the amount of such tax.

Therefore, an export tax on pulpwood shipments to the United States would not, as is popularly supposed, be paid by the American importer. It would come out of the price received by the Canadian producer.

PART III.—DIRECT REASONS AGAINST AN EMBARGO ON PULPWOOD

1. *It is Unsound Economically.*

It is an attempt to make a country prosperous and its people wealthy by legislation. It blocks up natural trade channels, offends against the laws of supply and demand, restricts exports (which are our chief instrument with which to maintain the balance of trade), involves a false conception of conservation, and, in its effect, denies to the present generation their rights in the natural resources of the country.

There is something wrong with a policy which works out so that, although a property owner may, if he choose, slash, strip, burn, and completely destroy his woodlot, he cannot carry on a reasonable and prudent operation and sell his wood in the United States.

2. *It is Class Legislation in an Insidious and Vicious Form.*

It is for the benefit of the Pulp and Paper Manufacturer at the expense of the timberland owner.

Under the guise of conservation, the Pulp Manufacturer calmly proposes to compel the land owner, by law, to keep his wood on the stump until the manufacturer is ready to use it. If, when that time comes, the wood has not been destroyed by fire, wind, or insects, then the manufacturer will take it at a price which he himself will fix, and which obviously will not in any case be higher than it would cost to cut off his own land.

If it is true that Canadian Mills will ultimately require the wood, their obvious course is to go into the market and buy the land or wood in fair competition, with the United States manufacturers. They should themselves finance and insure their future supply of raw material. There seems to be no reason why the woodlot owner should be forced by law, not only to tie up his capital but to carry the risk of loss by fire and other causes, for their benefit.

3. *It Reduces the Value of Every Acre of Freehold Woodland.*

In the last ten years, a new factor has entered into the price of woodlands, namely: their value from a pulpwood standpoint. Probably the bulk of privately owned timber lands in Canada to-day is worth more for pulpwood than lumber. To realize the pulpwood value, the owner must have the benefit of the United States market and the competition of the United States buyer. An embargo, by a stroke of the pen, would wipe out both market and competition. A reduction in land values is inevitable; the most profitable use to which the product could be put is gone.

4. *It Would Mean the Waste of a Great Deal of Burnt and Budworm Killed Wood Now Salvaged.*

Canadian fire killed wood is sold extensively to United States Companies, and there is the case of one company at least which has operated its mills con-

SESSIONAL PAPER No. 310

tinually and exclusively for over five years on fire killed wood. Shutting off the United States market means the loss of the opportunity to promptly dispose of a large quantity of this damaged wood. Without an open competitive market there would be little chance of being able to realize on it at a fair value and it would be left to rot and blow down, resulting not only in a total loss but in a greatly increased fire hazard.

5. *It would Destroy Our Only Market for Poplar.*

The development of the commercial use of poplar, has been principally in making soda pulp. Soda pulp is not manufactured in Canada to any extent, so that without the United States market the wood would be practically worthless. The demand from across the line has been a source of unexpected revenue for many small land owners. This tree begins to deteriorate after about thirty years, and cutting off the United States market would mean an almost complete loss to Canadian owners of this class of wood. Every year over 200,000 cords of poplar are exported to the United States, and if not so utilized would have to be burned by the settler or would rot on the stump.

6. *It May Act as a Boomerang. Interference with this Comparatively Insignificant Item in our Exports of Forest Products May Jeopardize the, Whole, the Biggest and Most Rapidly Developing Trade Connection we have with the United States.*

(a) THE IMPORTANCE OF OUR TRADE, WITH THE UNITED STATES, IN WOOD PRODUCTS.

For the year ending March 31, 1924, the total exports to the United States of all merchandise produced in Canada amounted to Four Hundred and Thirty Million Dollars.

Wood products and paper alone comprised Two Hundred and Thirty Million Dollars of this amount (over 50 per cent of the total) whilst of this Two Hundred and Thirty Millions, only Fourteen Millions, or approximately 6 per cent, was pulpwood.

The above was no exceptional year in this respect. Wood products and paper have been steadily advancing to a premier place in our foreign commerce and for the last three years have made up over one-half the Country's entire exports to the United States.

It is felt that there is not a thorough appreciation of the extent to which Canada's interests are wrapped up in this trade. There is a feeling, evident at times, that the woodland owner and the manufacturer are the only persons interested in the embargo debate, but anything which even threatens to endanger the security and continuity of a trade of such immense comparative volume, should arouse not only the intense interest, but the keen anxiety, of Canadians generally, since all must inevitably be affected by the dislocation of a trade connection of this magnitude. It may be asked in what way an embargo on pulpwood might adversely affect this valuable commercial relation? The next four paragraphs indicate the answer.

(b) THE ALMOST INEVITABLE LOSS OF CONFIDENCE.

There are Canadian woodlands that have been bought and paid for by United States citizens in good faith. Their purpose in buying such lands was, as everybody knew, to use them to supply their mills in their own country. No one discouraged them in buying, nor suggested that they would be deprived of the benefit of their purchase by having to erect new mills in Canada and thus double their plant investment, or accept the alternative of selling out their Canadian holdings to their Canadian competitors. If the United States owner

of Canadian woodlands is compelled to grind his wood in Canada he may well fear that, if he *does* erect a grinder, the next step will be to embargo his ground-wood. Once bitten he will naturally be "twice shy," and he can hardly be blamed if he becomes skeptical of Canada as a desirable field for investment and turns his attention in some other direction where he can have a reasonable prospect of getting what he considers he has paid for.

All over Canada there are object lessons illustrating our reliance on outside capital. Naturally, as a young nation, we must look abroad for a substantial part of the capital with which to increase our industrial development; and, at least so long as that state of affairs continues, we certainly cannot afford to lose the confidence of the foreign investor.

(c) THE MISTAKEN IDEA THAT CANADA HAS A MONOPOLY IN WOOD.

Contrary to the prevailing idea, it must not be overlooked that if the American is forced to turn away from Canada for raw materials, he will find that we have not by any means a monopoly. For instance, wood from Russia, in large quantities, is already quoted freely, by substantial concerns, for delivery at Atlantic seaports; and Pacific Coast pulpwood has recently been offered for similar delivery at prices which cannot be met by the pulpwood producers of Eastern Canada. To-day United States operators can buy Scandinavian and other European pulp cheaper than they can manufacture Canadian wood. The evidence given in the enquiry on this whole subject of alternative source of supply for the United States makes elaboration of this point, beyond referring to the Record, unnecessary.

(d) RESULTANT STIMULATION OF UNITED STATES INITIATIVE AND RESOURCES

If the United States operator has the Canadian door shut in his face, he will naturally consider it to his interest to intensively encourage forestry conservation and development in the United States to insure independence as far as possible. It will also stimulate him in his research concerning the possibility of substituting wood now obtainable in the United States for that obtainable in Canada. Already most of the hardwoods are being successfully utilized, and the remarkable recent development of the use of Long Leaf Southern Pine in the Kraft industry is an instance of what may be expected if, by reason of an embargo, "necessity" becomes the "mother of invention."

In short, there is a possibility that, in the attempt to take advantage of the supposed extremity of our neighbour, we may discover, not only that we have jeopardized a valuable trade connection in paper products and lost his confidence as well, but that we have stimulated him in the development of his own resources and in the exploiting of his own possibilities, and unconsciously encouraged his trade with other countries at the expense of our own.

Our only consolation will be that our pulp wood still stands on the stump for posterity, provided it is not wiped out by fire in the meantime.

(e) POSSIBILITIES OF RETALIATORY ACTION

Having begun such a trade war, we, of course, should not complain of retaliation. These are some possibilities:—

(1) The imposition by the United States of embargoes on coal, sulphur and other raw products utilized by many Canadian Pulp and Paper Mills.

(2) Increase of United States duties on certain manufactured pulp and paper products which are as yet only manufactured in Canada on a very small scale, if at all. This would prevent or delay Canadians from engaging in the widest possible range of manufacture of pulp and paper products. Such duties might in their effect be retaliatory although ostensibly justified on other grounds.

SESSIONAL PAPER No. 310

(3) Action under regulations permitting the imposition of duty on paper coming from a country which restricts the exportation of raw material used in paper manufacture.

Note the recent steps taken by the Americans to put themselves in a position for instant retaliation. (Supplement to U. S. Statutes of 1923, p. 347, par. 1301).

"The duty on printing paper not specifically provided for, shall be one-fourth of one cent per pound, and ten per cent ad valorem, with a provision that if any country, etc., forbids or restricts or imposes any export duty, etc., on printing paper, wood pulp or wood for use in the manufacture of wood pulp, the President may enter into negotiations with such country for the removal of such prohibition, etc., and if not removed he may, by proclamation, declare the failure of the negotiations. Thereupon until the removal of such prohibition, etc., printing paper imported directly or indirectly from such country, etc., shall pay an additional duty of ten per cent, ad valorem, and in addition thereto an amount equal to the highest export duty imposed by such country, etc., upon either an equal amount of pulp wood or wood for use in the manufacture of pulp wood, necessary to manufacture such printing paper." (See Canadian Hansard, 1923, June 26th, page 4546).

7. It Does not Adequately Provide for the Widely Different Conditions in the Various Provinces.

It is an attempt to impose one rigid policy for the whole country regardless of essential differences in local conditions, and it is opposed to the spirit of the constitution which wisely commits to the Provinces matters affecting property and civil rights, which demand special treatment to suit varying local requirements.

The evidence in the inquiry of your Royal Commission, established nothing with more certainty than that there existed the greatest divergence in conditions surrounding the supply and utilization of wood in different sections of the Dominion. One province had abundant forest stands with power facilities in proportion; but in that very province the competition of the United States buyer was necessary to ensure the land owner a fair price for his wood. In another province the possibility of power development was comparatively meagre, the wood supply was scattered and consisted of numerous individual small holdings, but there existed the compensating factor of easy access to the United States market. In still another province fire and insects took a relatively heavy toll and made a market of the greatest possible capacity and certainty, doubly desirable, so that the damaged wood might be saved and realized on. In another, the utilization of wood cut in the process of clearing and settlement required a large consuming market readily available; and there is still another where local conditions make it advantageous to export, not only pulp-wood, but logs in the round, piling, and fuel wood.

In some of these provinces crown lands had been granted or leased on terms that the wood should be manufactured in Canada, while in others the local situation as to power sites, scattering nature of wood supply, market opportunities, and other factors, had been such as to lead the public authorities to recognize that the widest opportunity for trading was desirable and that restrictions would simply lock up a part of the country's natural wealth without resultant benefit to any one.

Premier Armstrong of Nova Scotia well expressed it in his letter to your Commission on October 4 last, when he said:—

"With respect to the general application in this province of an embargo on the export of pulpwood, I am convinced that the varying local conditions in each province illustrate and forcibly emphasize the desirability of preserving intact Provincial jurisdiction in dealing with property and civil rights."

And Premier Taschereau of Quebec, speaking in the Legislative Assembly of that province on March 10 of this year expressed the same viewpoint in equally forceful terms as follows:—

"What might suit British Columbia might not suit Quebec, or Nova Scotia, or New Brunswick, and I suggest very firmly to our friends at Ottawa that they seek to get all the necessary information, that they gather all facts available as to the forestry situation in Canada, but to leave to each province the care, and the exclusive care, of the forests so that each province may take the steps necessary to protect the forests consistent with the needs of colonization and agriculture. We will await with interest the work of the Commission, and in the meantime suggest to Ottawa to leave to each province the disposal of the forests within its respective limits so that each province may take what steps are necessary in the best interests of its own people."

Obviously Provincial autonomy is the only practical agency by which to determine the appropriate policy in these various instances. To impose one standardized cast iron regulation would not only be an invasion of Provincial rights, but would be to pay no attention to radical differences in economic conditions throughout the country, and to sacrifice entirely the interests of certain sections for the sake of a fruitless uniformity.

BINDING LIST SEP 1 1928

**University of Toronto
Library**

**DO NOT
REMOVE
THE
CARD
FROM
THIS
POCKET**

**Acme Library Card Pocket
Under Pat. "Ref. Index File"
Made by LIBRARY BUREAU**

